Five-Year Review Report

First Five-Year Review Report
for
McCormick and Baxter Superfund Site
City of Stockton
San Joaquin County, California

September 2008

United States Environmental Protection Agency
Region IX
San Francisco, California

Approved by:

Kathleen Salyer

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Superfund Division
California Site Clean-up Branch
U.S. Environmental Protection Agency, Region IX

Date:

9/10/08

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List of Acronyms and Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
Cal EPA	California Environmental Protection Agency
C&A	Cleanup and Abatement
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon
CPA	Cellon Process Area
CWA	Clean Water Act
DNAPL	Dense Non-Aqueous Phase Liquid
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EFH	Essential Fish Habitat
ESU	Evolutionarily Significant Unit
ESD	Explanation of Significant Difference
FFS	Focused Feasibility Study
FS	Feasibility Study
Hwy	Highway
I-5	Interstate 5
IC	Institutional Control
IRIS	Integrated Risk Information System
LDR	Land Disposal Restriction
LPAH	Low Molecular Weight Polycyclic Aromatic Hydrocarbon
µg/kg	Microgram per kilogram
mg/kg	Milligram per kg
MPA	Main Processing Area
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAPL	Non-Aqueous Phase Liquid
NCP	National Contingency Plan
ncPAH	Noncarcinogenic PAH
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NWQO	Numerical Water Quality Objectives
OM&M	Operations, Maintenance, and Monitoring
OU	Operable Unit
OWPA	Oily Waste Ponds Area
PAH	Polycyclic Aromatic Hydrocarbon
PCDD/F	polychlorinated dibenzo dioxins and furans
PCP	Pentachlorophenol
PRG	Preliminary Remediation Goal

PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resources Control Board
TBC	To Be Considered
TCDD	Tetrachlorodibenzo-*p*-dioxin
TEF	Toxicity Equivalence Factor
UPRR	Union Pacific Railroad
URA	Uniform Relocation Assistance and Real Property Acquisition Policies Act
US	United States
USACE	United States Army Corps of Engineers
USC	US Code
USEPA	United States Environmental Protection Agency
VDE	Visual Dust Emissions
WQO	Water Quality Objective

Executive Summary

The U.S. Environmental Protection Agency, Region IX has conducted the first Five-Year Review of the McCormick and Baxter Superfund Site in Stockton, California. The purpose of this review is to determine whether the remedial actions implemented at the Site are protective of human health and the environment. This Five-Year Review is required because the sediment remedial action (capping) has left hazardous substances on-site above levels that allow for unlimited use and unrestricted exposure. The methods, findings, and conclusions of the review are documented in this report. In addition, this report summarizes issues identified during the review and includes recommendations and follow-up actions to address them. The triggering action for this review was the initiation of bank stabilization work along Old Mormon Slough that comprised Phase I of the sediment remedial action.

The McCormick and Baxter Creosoting Company operated at 1214 West Washington Street in Stockton, California for approximately 50 years until 1991. Various wood preservation processes were used at the Site during its operational history. Preservatives included creosote, pentachlorophenol (PCP), arsenic, copper, chromium, and zinc. Solvents or carriers for these preservatives included petroleum-based fuels, such as kerosene and diesel, butane, and ether.

The 1999 Record of Decision (ROD) selected remedies for the three Operable Units (OUs) at the Site: 1) groundwater (OU-1), 2) uplands soils (OU-2), and 3) surface water and sediment (OU-3). The selected remedy for the surface water and sediment OU is the placement of a sand cap over contaminated sediment in Old Mormon Slough and associated bank stabilization along the south bank and east end of the slough. EPA completed Phase I of the sediment remedy (bank stabilization) in 2003 and completed Phase II (placement of a sand cap over the contaminated sediment) in 2006. The selected soils remedy is consolidation and capping of contaminated Site soils. Remedial design work is underway, but no construction work has started for this remedy. An interim containment remedy using pump-and-treat technology was selected for the groundwater OU but has not been implemented. A considerable amount of investigatory work has taken place since the 1999 ROD concerning NAPL characterization and its direct impact on groundwater. NAPL removal via thermal treatment was evaluated in a conceptual design conducted post-ROD. Monitoring data collected after the ROD suggested that natural degradation of many contaminants in groundwater at the Site was occurring. As a result, EPA is preparing a focused Feasibility Study that will provide the basis for selecting a revised groundwater remedy for the Site. The goal of the focused Feasibility Study is to perform a more rigorous evaluation of monitored natural attenuation to compare with thermal and the other active remedial technologies. Because neither the soils nor groundwater remedies have been fully implemented, they are not addressed in detail in this Five-Year Review, which focuses on the surface water and sediment remedy.

Based on the document and data review conducted and all information available at the time of this review, the implemented surface water and sediment remedy is protective of human health and the environment.

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Five-Year Review Summary Form

SITE IDENTIFICATION

Site name ***(from WasteLAN)*****: McCormick & Baxter Creosoting Company**

EPA ID ***(from WasteLAN)*****: CAD009106527**

Region: 9	**State: CA**	**City/County: Stockton/San Joaquin**

SITE STATUS

NPL status: ☒Final ☐Deleted ☐Other (specify)

Remediation status (choose all that apply): ☒Under Construction ☒Operating ☐Complete

Multiple OUs?* ☒YES ☐NO	**Construction completion date:** NA

Has site been put into reuse? ☐YES ☒NO

REVIEW STATUS

Lead agency: ☒ EPA ☐State ☐Tribe ☐Other Federal Agency _____

Author name: Patricia Bowlin

Author title: Remedial Project Manager	**Author affiliation: USEPA Region 9**

Review period:** 11/2007 to 9/2008

Date(s) of site inspection: April 7-8, 2008

Type of review:

☒Post-SARA ☐Pre-SARA ☐ NPL-Removal only

☐Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐Regional Discretion

Review number: ☒ 1 (first) ☐ 2 (second) ☐3 (third) ☐Other (specify) _____

Triggering action:

☒Actual RA Onsite Construction at OU #__03__ ☐Actual RA Start at OU#____

☐Construction Completion ☐Previous Five-Year Review Report

☐Other (specify)

Triggering action date ***(from WasteLAN)*****:** 10/22/2002 (sediment cap bank stabilization project)

Due date ***(five years after triggering action date)*****:** 10/22/2007

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

There are no significant Five-Year Review issues at this time.

Minor issues include access restriction deficiencies such as holes in the perimeter fencing and worn/damaged/illegible warning signs. These deficiencies have allowed trespassers to enter the Site. The soils remedy has not been implemented and the final groundwater remedy has not been selected to date; therefore these are Site issues which are in the process of being addressed, but which are not brought forward in this Five-Year Review.

Recommendations and Follow-up Actions:

Recommendations/follow-up actions on minor issues are to repair or replace the deficient perimeter fencing and signage to reduce or eliminate unauthorized Site entry.

Protectiveness Statement:

The implemented surface water and sediment remedy at the McCormick and Baxter Superfund Site is protective of human health and the environment.

Other Comments:

The McCormick and Baxter Superfund Site is considered "Current Human Exposure Not Under Control" because contaminants in the sediment had bioaccumulated in fish prior to implementation of the surface water and sediment remedy. The levels of contaminants in certain locally-caught fish species may pose a health risk to anglers who consume them. It will take several years for the existing population of contaminated fish to be replaced by clean fish. EPA has posted signs and conducted public outreach advising people to not consume fish from the slough.

McCormick and Baxter Superfund Site
Stockton, San Joaquin County, California
First Five-Year Review Report

I. Introduction

This is the first site-wide Five-Year Review report for the McCormick and Baxter Superfund Site located in Stockton, San Joaquin County, California. The start of Phase I of the OU-3 Sediment Remedial Action in 2002 was the triggering action for this review.

The Purpose of the Review

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

Authority for Conducting the Five-Year Review

The U.S. Environmental Protection Agency (EPA) prepared this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

Who Conducted the Five-Year Review

EPA Region 9, assisted by the U.S. Army Corps of Engineers (USACE), has conducted a five-year review of the remedial actions implemented at the McCormick & Baxter Superfund Site in

Stockton, California. The site inspection was conducted by Joseph Marsh of the USACE, Seattle District. An assessment and analysis of ARARs, risk and toxicology, and data review were conducted by John Wakeman, Jefferey Powers, and Joseph Marsh, USACE. This review was conducted for the entire Site from November 2007 through August 2008 and covers the period from 2002 to 2008. This report documents the results of the review.

Other Review Characteristics

The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. Because the surface water and sediment remedy is the only completed remedy on Site thus far, the focus of the Five-Year Review will be on this remedy. Surface soils and groundwater remedies will be discussed to the extent to which progress has been made on the respective remedy.

II. Site Chronology

The following table summarizes, in chronological order, the major milestones or notable events for the McCormick and Baxter Superfund Site.

Table 1 – Chronology of Site Events

Event	Date
McCormick & Baxter Creosoting Company in operation at Site	1942 - 1991
Fish kill in New Mormon Slough and Stockton Deepwater Channel caused by PCP-contaminated stormwater runoff from Site	1977
RWQCB Cleanup and Abatement Order	1978
M&B entered into agreement with DTSC and RWQCB to investigate on-site contamination	1984
EPA site inspection, preliminary assessment, hazard ranking	1984
M&B filed for bankruptcy	1988
EPA listing site investigation report	1991
M&B baseline (human health) risk assessment	1990
M&B ceases on-site wood treating operations	1990
Final listing on EPA National Priorities List	1992
EPA becomes lead agency for Site cleanup	1992
Removal of industrial chemicals, sludge, tanks, demolition and removal of most buildings	1992 - 1997
Combined Remedial Investigation/Feasibility Study activities	1992 - 1999
Sheet pile wall installed along Old Mormon Slough shoreline to control seeps from oily waste ponds area	1996
Soil and oily waste excavated from oily waste ponds area and transferred to a lined on-site disposal area. Oily waste pond area backfilled with clean soil; lined disposal area and main processing area capped with asphalt	1997
Proposed Plan	1998

Event	Date
Record of Decision (final remedies for soil and sediment and interim remedy for groundwater)	1999
Remedial design of sediment remedy	1999 - 2002
Phase I sediment remedy completed (bank stabilization)	2003
Explanation of Significant Differences	2005
Remedial design/remedial action negotiations for soil remedy	2000- 2006
Vessels removed from capping area within Old Mormon Slough	2006
Phase II sediment remedy completed (sediment capping)	2006
Consent Decree for soil RD/RA	2007
First five-year review completed	September 2008

III. Background

Physical Characteristics

The McCormick and Baxter Superfund Site (Site) is located at 1214 West Washington Street within the City of Stockton, California in San Joaquin County. The Site occupies approximately 32 acres near the Port of Stockton at the junction of Interstate 5 and State Highway 4 (Figure 1). The northern boundary of the Site is formed by Old Mormon Slough, which connects to the Stockton Deepwater Channel on the San Joaquin River. Other Site boundaries include Washington Street to the south and east, and an industrial facility located at the Port of Stockton Turning Basin to the west. An eight-acre parcel of land in the southeastern portion of the Site is owned by the Union Pacific Railroad (UPRR).

The Site is located on the margin of the Sacramento River-San Joaquin River Delta in the Great Valley geomorphic province of California. The terrain has low relief, with elevations ranging from eight to 15 feet above mean sea level (MSL). Surface water bodies in the vicinity of the Site include Old Mormon Slough, New Mormon Slough, the Stockton Deepwater Channel, and the San Joaquin River. The sloughs are tidally influenced and experience a maximum tidal range of about three feet. Stockton Deepwater Channel, the Port of Stockton Turning Basin, and Old Mormon Slough are areas of net sediment deposition. The Deepwater Channel and the Turning Basin are regularly dredged to maintain depths appropriate for ship traffic, and the outer portion of Old Mormon Slough has historically been dredged. Old Mormon Slough is approximately 2,500 feet long and 160 feet wide. Following remedial capping, the slough next to the property is approximately six to 14 feet deep depending on lateral position and tidal levels.

The former processing and tank farm areas are paved; the rest of the Site is unpaved with limited vegetative cover. Railroad tracks are situated on many areas of the Site. Most of the former structures have been removed. An office building, two storage sheds, a storm water collection system lift station, gas station building with foundation (no fuel storage tanks), a wooden tower, and a building near the tower are the only remaining above ground structures. Underground sump-like basement foundations and associated piping for the former pressure treatment units

remain in the central portion of the Site under the cap. Entry to the Site is controlled by a perimeter fence and 24-hour security service.

Land and Resource Use

The Site is located in a predominantly industrial land-use area. An industrial facility operates to the west of the Site adjacent to the Turning Basin. Other nearby land uses include light manufacturing and residential. The nearest residential areas are approximately 500 feet southwest of the Site boundary, and 750 feet southeast beyond the I-5/Hwy 4 junction. These residential areas can be seen in the southwestern and southeastern quadrants of Figures 1 and 2.

Non-potable supply wells (for either industrial or agricultural uses) exist to the northeast of the Site, however, the high salinity and total dissolved solids content of the water indicate that potable supply wells likely would not be installed downgradient of the Site. The City of Stockton has a population of 243,771 (2000 U.S. Census), most of whom reside within five miles of the Site.

Old Mormon Slough was historically used for water-borne transportation of lumber and other goods, and the western end of the Slough, where it adjoins the Turning Basin, is still used as a docking area for barges and other vessels. At the time the sediment remedy was entering the remedial design stage, there was an individual living on an old produce barge that was docked near the eastern end of the Slough.

History of Contamination

The McCormick and Baxter Creosoting Company conducted wood treating operations at 1214 West Washington Street from 1942 until 1990. Various wood preservation processes were used at the Site during its operational history. The treated wood products were used primarily by power utilities, railroads, and the construction industry. Preservatives included creosote, pentachlorophenol (PCP), arsenic, copper, chromium, and zinc. Solvents or carriers for these preservatives included petroleum-based fuels such as kerosene and diesel, butane, and ether.

Most treatment processes consisted of pressure impregnation of the preservative solutions in retorts. Pressure-treated wood was removed from the retorts and allowed to dry in various wood storage areas throughout the Site. The primary facility areas identified as principal sources of contamination include the Main Processing Area (MPA), Oily Waste Ponds Area (OWPA), Cellon Process Area (CPA) and PCP Mixing Shed/Butt Tank Area (Figure 2). On Figure 2, the closest residences are just visible at the middle of the left side, approximately 1,000 ft from the nearest Site boundary.

Soil contamination occurred through the various handling processes and some on-site disposal of products containing the preserving chemicals. Sediment contamination resulted from stormwater runoff, direct spills of chemicals during processing operations and unloading of chemicals from barges, and NAPL migration from the upland Site. Groundwater contamination occurred through both free-phase and dissolved phase transport through the vadose zone and spread as the result of advective and dispersive properties of the aquifer and chemical media. A fish kill

occurred in the waters of the New Mormon Slough and Stockton Deepwater Channel following a major storm event in 1977, which prompted an investigation into the cause.

Initial Response

The fish kill was traced to PCP-laden stormwater runoff from the McCormick and Baxter facility, which discharged into New Mormon Slough via a connection to the City storm drain system. In response, the California Regional Water Quality Control Board (RWQCB) adopted a Cleanup and Abatement Order ("C&A Order") in 1978. Pursuant to the C&A Order, McCormick and Baxter installed a stormwater collection system and perimeter levees to prevent further stormwater discharges from the Site.

In 1981, McCormick and Baxter closed the oily waste ponds by removing approximately 144 tons of contaminated soil from the area of the larger pond and backfilling the area with clean fill. In 1984 McCormick and Baxter entered into an agreement with the California DTSC and the RWQCB to conduct soil and groundwater sampling under State oversight. Additional soil and groundwater contamination was found to be present. McCormick and Baxter operated two groundwater extraction wells beginning in the mid-1980s to provide limited control of the groundwater contaminant plume. Dust control was practiced at the Site until closure; however, no actions to address soil or sediment contamination were undertaken.

In 1988, McCormick and Baxter filed for bankruptcy protection under Chapter 11 of the Bankruptcy Code. On November 7, 1990, the U. S. Bankruptcy Court for the District of Oregon entered a First Amended Plan of Reorganization, which included an Agreement RE Environmental Remediation of Stockton Facility ("Reorganization Plan"). The Reorganization Plan required, in part, that McCormick and Baxter undertake environmental response actions at the Site. On October 25, 1991, McCormick and Baxter advised the State of California ("State") that due to actions by McCormick and Baxter's lender, McCormick and Baxter would cease operating and discontinue environmental response actions.

Basis for Taking Action

A Baseline Risk Assessment conducted in 1990 (CH2M HILL, 1990) concluded that while exposure probability was in most cases low, excess lifetime cancer risks and hazard indices were above their respective thresholds for acceptable risk for many routes of exposure for the principal contaminants of concern (arsenic, PCP, benzene, PAHs, 2,4,6-Trichlorophenol). On-site occupational workers and trespassers had moderate exposure probabilities due to soil ingestion and/or vapor inhalation pathways.

Based on the results of a preliminary assessment/site inspection, EPA proposed the McCormick and Baxter Site for inclusion on the National Priorities List (NPL) and listed the Site on the NPL in October 1992.

From 1992 to 1997, EPA conducted several phases of removal actions to stabilize Site conditions, improve Site security, and demolish and dispose of above-ground structures and equipment which posed both health and safety hazards. In 1996, EPA addressed contaminant

releases into Old Mormon Slough by installing a 437-foot long sheet pile wall along the southwestern shore line of the slough to control oily seepages from the former oily waste ponds area. In 1997, EPA excavated approximately 12,000 cubic yards of contaminated soil from the ponds area and contained the excavated soil in a lined repository in the central portion of the Site. EPA then covered the lined repository and main processing area with an asphalt cap.

EPA also conducted several phases of Site investigations as part of the Remedial Investigation (RI) for the Site beginning in 1992. Specific activities included soil, groundwater, and sediment sampling; monitoring well installation; aquifer testing; a non-aqueous phase liquid (NAPL) study; a tidal influence study; vadose zone modeling; groundwater modeling; and performance of a human health risk assessment and an ecological risk assessment.

A Feasibility Study was conducted pursuant to the RI activities, and EPA issued a Proposed Plan for soil, groundwater and surface water/sediment in 1998.

IV. Remedial Actions

The following section details the remedial actions selected for Site soil, sediment and groundwater, the status of their implementation, and Site operation and maintenance.

Remedy Selection

On March 31, 1999, the ROD was signed for the Site which described the final selected remedies for two of three Site operable units, and an interim remedy for the third. Final remedies were selected for the surface water and sediment OU and the soil OU, while an interim remedy was selected for the groundwater OU. In 2005, EPA issued an Explanation of Significant Differences (ESD) to clarify that the sediment remedial action included bank stabilization work needed to protect the cap and the permanent relocation of the individual living on a barge in the slough (including relocation of his vessels).

Surface Water and Sediment OU: As stated in the ROD, the remedial action objectives (RAOs) for the surface water and sediment OU are as follows:

- Reduce potential risks to human health from the consumption of fish contaminated with Site-related chemicals
- Prevent humans and aquatic organisms from direct contact with sediment having contaminants in excess of risk-based concentrations or that have been shown to be toxic to aquatic organisms
- Prevent or minimize the migration of contaminants from Old Mormon Slough sediments into the surface water column
- Prevent or minimize the migration of contaminants from Old Mormon Slough sediments to groundwater
- Allow full attainment of the beneficial uses of surface waters in the area of the Site, including fish and shellfish harvesting and the protection of aquatic life and wildlife.

The selected sediment remedy consisted of in-situ capping of contaminated Old Mormon Slough sediments in order to physically and chemically isolate areas of principal threat waste (approximately three-fourths of the slough) by blanketing them with a minimum of two feet of clean fine sand. Isolation of sediments below the cap would ultimately serve to protect the surface water and reduce human health risks by preventing the migration of contaminants from the sediment into the water column as well as their uptake by fish and other aquatic biota. The project involved using 45,000 cubic yards of dredged material from the Corps of Engineers' Rio Vista Dredge Disposal Site for use as the in-water sediment cap material. Prior to capping, the southern and eastern banks of the slough were cleared of debris and armored with rip-rap and gravel filter layer where needed to prevent erosion. The capped portion of the slough runs from just north of the OWPA area to the east end of the slough. The dimensions of the cap were estimated at approximately 2,330 ft long by approximately 167 ft wide, with a design thickness of 2 ft (see Figure 3 for an as-built difference plot or isopach map in feet). The cap covers an estimated 8.8 acres of the slough bottom.

Soil and Groundwater OUs: As stated in the ROD, the RAOs for the soil and groundwater OUs are as follows:

- Prevent human exposure to contaminated surface soils via direct contact, ingestion or inhalation
- Prevent stormwater runoff of contaminated surface soils into adjacent surface water bodies
- Prevent or minimize the migration of contaminants from subsurface soils and from Old Mormon Slough sediment to groundwater
- Prevent human exposure to groundwater contaminated above drinking water standards
- Prevent the further spread of the groundwater contaminant plume
- Remove NAPL to the extent practicable to reduce the continuing source to groundwater contamination
- Contain NAPL sources than cannot be removed
- Evaluate further groundwater risk reduction

Soil OU: To achieve the RAOs for soil, the selected vadose zone soil remedy consisted of excavating contaminated soils on the eastern half of the Site (an area referred to as Subarea X - see Figure 2), moving them to western half of the Site (an area referred to as Subarea Y) and covering the consolidated soils with a cap (i.e., consolidation and capping). Since Subarea X was not the most heavily contaminated portion of the Site and was not directly over the majority of principal source areas, contamination in this area is generally limited to surface soils less than one foot deep. Alternately, contamination within Subarea Y has been delineated up to 13 feet bgs (and in a few locations to 39 feet bgs). Contaminant concentrations are also one to two orders of magnitude higher in Subarea Y compared to Subarea X. Total estimated in-place volumes of contaminated soils in Subareas X and Y are 37,100, and 212,500 cubic yards, respectively. Contaminants identified in Site soils include PCP, benzo(a)pyrene, arsenic, and dioxin. See Figure 2 for the extents of Subareas X and Y.

The components of the soil remedy include:

- Site clearance and debris removal

- Excavation of Subarea X soils
- Initial grading of the area to be capped
- Backfilling of Subarea X excavations with clean import fill
- Backfilling and grading of the stormwater ponds, which are located in Subarea Y, with a portion of excavated Subarea X soils (approximately 10,000 cubic yards)
- Consolidation of remaining Subarea X soils in Subarea Y, and cap construction over the contaminated soil
- Cap maintenance
- Institutional controls

Groundwater OU: The objective of the selected interim groundwater remedy was to contain the groundwater contaminant plume to prevent migration of Site COCs in the downgradient direction and to prevent further degradation of the aquifer beneath the Site. The remedy was also to include the removal of NAPL using extraction wells located in NAPL-impacted areas to the extent feasible.

This interim remedy included the following components:

- Extraction of groundwater from multiple wells in multiple aquifer zones to contain the contaminant plume
- Systematic DNAPL extraction using dedicated wells and LNAPL removal using a skimmer
- On-Site treatment of groundwater through the preferred groundwater treatment train
- Disposal of treated groundwater through a combination of NPDES discharge into surface water and reuse for irrigation or industrial uses
- Off-Site recycling or treatment/disposal of extracted NAPL
- Long-term monitoring of groundwater and NAPL

Remedy Implementation

The surface water and sediment remedy implementation commenced on October 22, 2002 with bank stabilization, a pre-capping remedy component along the southern and eastern edge of the slough that was necessary to prevent the bank from eroding into the slough and potentially compromising cap integrity. Prior to beginning the cap placement, however, it was necessary to relocate an individual living on a barge in the Slough (as well as to remove all vessels from the Slough) in order to ensure that the cap, once constructed, would not be damaged by the continued presence of the barge and/or movement of vessels in and out of the Slough. After lengthy but unsuccessful efforts by EPA to permanently relocate him, the resident was moved to a temporary relocation dwelling in 2006 and all vessels were removed from the capping area. Capping work was performed in the latter half of 2006. As placed (after some consolidation), all areas of the cap were at least 18 inches thick, 99.5% of the cap was greater than 18 inches thick, and the average cap thickness was 2.6 ft. Figure 3 shows the as-built isopach or difference plot, in feet, following the construction. Additionally, a log boom was installed at the outer end of the slough to prevent boat traffic from entering and damaging the cap, as well as to exclude fishermen.

An O&M Plan for the Sediments and Surface Water OU was developed in 2006. This plan is an administrative document aimed at providing a general description of O&M activities to be conducted. The Plan calls for an additional bathymetric survey in 2008 and sediment testing to confirm that the cap is not recontaminated above the cleanup standards (21 ng/kg toxicity equivalent concentrations for dioxins/furans; 333.3 mg/kg [organic carbon normalized] for total PAH). The O&M Plan details a requirement for an O&M Manual, also to be completed in 2008, which will serve as the technical guide to future (post 2008) cap performance sampling and laboratory testing.

The soil remedy has not yet been implemented, although soil cap design work is in progress at the time this Five-Year Review Report was being written. The soil remedy is expected to be started in fall 2008 and completed by 2009. A land use covenant (LUC) for UPRR's property was recorded on December 31, 2007. A draft LUC for McCormick & Baxter property is being reviewed by the property owner. Because the soil remedy has not been implemented, evaluation of protectiveness with respect to this media is deferred in this review.

The interim groundwater remedy has not been implemented for the Site. A considerable amount of investigatory work has taken place since the 1999 interim groundwater remedy selection concerning NAPL characterization and its direct impact on groundwater. NAPL investigations were conducted in 1999 and 2000, and NAPL removal via thermal treatment was evaluated as part of the groundwater remedy in a 2001 conceptual design report. Semi-annual to annual groundwater monitoring has been conducted at up to 60 monitoring wells situated on and off the Site. Evaluation of the monitoring data has led to the delay of the start of the interim groundwater remedy, and EPA instead has focused groundwater efforts on continued monitoring and a more rigorous evaluation of monitored natural attenuation similar to that previously done for thermal remediation. EPA will complete a focused feasibility study to determine if the contaminant plumes are stable and natural attenuation is occurring in the outer areas of the plume. As with soil remedy, the evaluation of the protectiveness of the groundwater remedy for the Site is deferred because the remedy has not yet been finalized or implemented.

System Operations, Maintenance, and Monitoring (OM&M)

Annual operation, maintenance, and monitoring costs of the completed sediment remedy are not yet available. EPA expects to refine the scope of OM&M activities and develop the associated cost estimate by fall 2008). Current site maintenance costs (not associated with any remedy implementation per se) include 24-hour Site security; grass mowing and utility maintenance/repairs; inspection and repair of perimeter fencing; and periodic groundwater monitoring, laboratory analysis, and data validation costs.

V. Progress Since the Last Five-Year Review

This is the first Five-Year Review for the Site. A summary of Site progress up to this point has been documented in Sections III and IV.

VI. Five-Year Review Process

Administrative Components of the Five-Year Review Process

Development of the process for the first Five-Year Review for the McCormick & Baxter Superfund Site, identification of the review team, and establishment of the review schedule was completed in late 2007. The Five-Year Review team was led by Patricia Bowlin, EPA Remedial Project Manager (RPM) for all OUs at the Site; with technical support from USACE team members John Wakeman, Joseph Marsh, and Jefferey Powers. The review schedule included the following components that are described in this section:

- Community notification and involvement
- Document review
- Data review
- Site inspection
- Development and review of this First Five-Year Review Report

Community Notification and Involvement

Attachment 6 contains the notification to the public of the preparation and availability of this first Five-Year Review Report. A newspaper advertisement announcing that EPA was conducting the Five-Year Review and welcoming public participation was published in the Stockton Record on August 20, 2008 (see Attachment 6). Two current or former residents of the area were interviewed as part of the Five-Year Review.

Document Review

Numerous documents were reviewed prior to and throughout preparation of this first Five-Year Review Report. The specific documents are listed in Attachment 1.

Data Review

Data collected as part of investigation activities supporting selection and/or implementation of the remedies for the OUs at the McCormick & Baxter Site were reviewed for this Five-Year Review Report. Pertinent data were reviewed for relevant trends, to identify possible improvements to the existing monitoring programs, and to assess opportunities to optimize the existing systems. Data review focused on the implemented sediment remedy.

Since sediment cap performance monitoring has not yet been conducted, no trends or conclusions can be made concerning contaminant concentrations in the cap or in fish. The soils remedy has not yet been implemented; hence no trend evaluations or conclusions may be made with respect to the medium of vadose zone soils. A summary of reviewed groundwater data for the Site is included as Attachment 5.

ARARS Review

No new information has come to light in this review to suggest changes to ARARs or TBC criteria for sediment or surface waters. Accordingly, the legal analyses performed at the time of the ROD and ESD remain valid.

Site Inspection

On April 7-8, 2008 Joseph Marsh, USACE Seattle District, conducted the Site Inspection. EPA RPM Patricia Bowlin also participated in the Site Inspection and interviews on April 7. The only implemented remedy, the sediment cap and ancillary features, appears in good condition based on the visual inspection conducted from the slough bank. Minor deficiencies associated with the Site include damaged fencing and a few warning signs requiring replacement. Also, weeds and tall grasses were evident which may present a potential wildfire hazard if not mowed. See Attachment 2 for details regarding the Site Inspection.

Interviews

During the site inspection, Joseph Marsh also conducted several interviews. These interviews included personnel who are either familiar with the Site itself or the surrounding properties. The following list details the personnel interviewed, and their relation to the Site:

- Robert Mentelos, Supervisor, Penny Newman Grain Inc. (Adjacent property)
- Lew Watkin, Supervisor, California Cedar Products Co. (Adjacent property)
- Bill Catlett, McCormick and Baxter Site Maintenance Lead, ITSI
- Craig King, McCormick and Baxter Site Security Guard, ITSI
- Ray Ipezza, nearby resident
- Herman Miller, former resident of barge in Old Mormon Slough

Although minor issues such as property purchase, occasional cutting of the fence and trespassing were discussed, no significant issues regarding Site protectiveness were raised. Details of these interviews are located in Attachment 2 under Section II, Interviews.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

A.1 Remedial Action Performance and Monitoring Results:

The principal remedial action reviewed during this Five-Year Review is the completion of bank stabilization and capping in Old Mormon Slough as a part of the Sediment OU. Activities in the Soil and Groundwater OUs have been directed towards remedial design and further alternative evaluation, respectively, during the review period.

Post-construction verification testing demonstrated that the cap was constructed according to the design specifications. A second verification data collection program is planned for the latter half of 2008 to validate that the cap remains at the design thickness and to finalize the Operational and Functional determination.

Ongoing groundwater monitoring indicates that the naphthalene plume is stable and generally remains on-property. The exception is in the D-zone, where one downgradient well (MW19D) located just south of State Route 4 contains naphthalene. Acenaphthene in groundwater extends off-property in the B-, C-, and D-zones, but does not pose an unacceptable risk for consumption of groundwater.

A.2 System Operations and Maintenance:

A data collection program is currently underway to determine whether the sediment remedy is Operational and Functional. This will consist of two parts: a hydrographic survey to determine that the cap is physically stable and a chemical sediment survey consisting of three samples to determine if any recontamination of the cap has occurred. Subsequently, an O&M Manual will be completed to detail the long-term monitoring program for this OU, including additional testing of sediments, fish tissue, and (potentially) cap thickness.

A.3 Costs of System Operations, Maintenance, and Monitoring:

Because no sediment remedy OM&M has yet been conducted, no costs are available.

A.4 Opportunities for Optimization:

There are no opportunities for optimization of the sediment remedy at this time.

A.5 Early Indicators of Potential Remedy Problems:

Based on the results of the Five-Year Review Site Inspection, the sediment remedy appears to be functioning as designed, and there are no early indicators of potential remedy problems.

A.6 Implementation of Institutional Controls and Other Measures:

Durable notification mechanisms or other institutional controls (ICs) are in place at the Site, including the UPRR property. This is to ensure that the proprietary controls in place will be known by any future purchaser of the property and that they are properly implemented. A land use covenant (LUC) for UPRR's property was recorded on December 31, 2007. A draft LUC for McCormick & Baxter property is being reviewed by the property owner.

Access restrictions are in place on-property and are considered "other measures" rather than ICs. The property is surrounded by a fence with a sign posted on the front gate stating "Superfund Site" warning authorized personnel as well as potential trespassers; also, a log boom with a similar sign in two languages is in place at the western end of the capped area of the Slough. The

site inspection indicates that these engineered controls (fences, log-booms, and signs) are in place. However, there is evidence that intruders have been fishing from the banks of the now-capped Old Mormon Slough. The cap was designed to physically isolate the contamination in place, burying the contamination to prevent direct contact to benthic organisms and re-suspension of the sediment, and decreasing the bioavailability of the contamination to water column organisms and to surface water itself. Due to the low solubility and high sorption properties of PAH and dioxins, they are believed to be adequately contained by the permeable cap; hence direct exposure is blocked. There is no evidence that trespassers are physically damaging the sediment cap.

Following capping, the concentration of Site-related contamination in resident fish is expected to decrease over time, thus reducing risk to humans. While PAH concentrations in fish do decrease at substantial rates, it is not likely that fish will have lost a significant portion of their dioxin body burden in the short time since the cap was constructed. Decreases in dioxin concentrations in fish occur at slower rates (e.g., Burkard et al. 2004 found lake trout had a rate of loss 1.8% of the body burden after 2 years).

See Attachment 4 for a detailed summary of ICs either implemented or planned for the Site.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?

B.1 Changes in Exposure Pathways:

There have been no changes in the land use since the ROD. As noted in A6 above, there may still be trespassing fishermen utilizing the south bank of Old Mormon Slough, and the fish may still have dioxin in their tissues from the pre-capping conditions in the slough. The only other exposure pathways are ones that are carefully controlled (e.g., the only on-site workers are site security guards and investigators that operate under Site-specific Safety and Health Plans).

B.2 Changes in Toxicity and Other Contaminant Characteristics:

Human Health

The Human Health Risk Assessment indicated that the exposures most likely to pose excess carcinogenic risks at the Site are those experienced by on-Site workers who are exposed to chemicals in Site soils through incidental ingestion and dermal absorption. The Site-related chemicals that contribute most to the excess carcinogenic risks are dioxin and arsenic (by direct contact with soils) and PCP (by ingestion of groundwater).

Since related cleanup standards for dioxins are set by risk, it should be noted that the EPA dioxin reassessment (USEPA 2003) has tentatively proposed a different carcinogenic slope factor for dioxins. This has not been finalized in the EPA Integrated Risk Assessment Information System (IRIS), as it is still being considered in light of the National Research Council (NRC 2006) review. Accordingly, the basis for toxicity has not changed significantly. The World Health

Organization (WHO 2005) has made minor changes to the methods by which dioxin toxicity equivalents are calculated. These toxicity equivalence factor (TEF) changes are minor, and do not affect the protectiveness of the remedial action of capping the slough.

The following table shows differences in terms of carcinogenic benzo(a)pyrene equivalents for carcinogenic PAHs, carcinogenic slope factor for naphthalene, and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin equivalents for dioxins and furans.

Table 2 – Changes in Toxicity Equivalence Factors Since the Risk Assessment and ROD, and Relating to Risk Drivers in the Sediment and Surface Water OU

CARCINOGENIC PAHs	EPA-TEF (Used in ROD)	CAL-TEF
Benzo(k)fluoranthene	0.01	0.1
Chrysene	0.001	0.01
Naphthalene	--	[A]
DIOXINS AND FURANS	WHO (1998) I-TEF	WHO (2006) I-TEF
1,2,3,7,8-PeCDD	0.5	1
OCDD	0.001	0.0003
1,2,3,7,8-PeCDF	0.05	0.03
2,3,4,7,8-PeCDF	0.5	0.3
OCDF	0.001	0.0001

[A] CalEPA has also determined that naphthalene is a carcinogen, with a slope factor of 0.12 $(mg/kg/d)^{-1}$ for both ingestion and inhalation. US EPA has not designated this compound a carcinogen.

These changes are expected to result in minor changes to risks due to soil contact due to existing controls and ongoing plans to consolidate soils under confinement. As EPA has not finalized groundwater cleanup values, toxicity changes since the ROD will be considered during completion of an ongoing Focused Feasibility study. Therefore, these changes do not indicate a lack of protectiveness of the remedies.

Ecological Risk

A review of information since the Ecological Risk Assessment has indicated no new conditions or toxicity information that would affect the determination that the remedy is effective. No sediment monitoring results have been taken during this period for comparison.

B.3 Changes in Risk Assessment Methods:

There have been no changes in risk assessment methods.

B.4 Changes in standards and TBCs:

No new information has come to light in this review to suggest new or changed ARARs nor TBCs for sediment or surface waters.

B.5 Expected Progress Towards Meeting RAOs:

The majority of remedial objectives for Old Mormon Slough sediment capping are believed to have been fully or partially achieved, including 1) reduction in potential risks to human health from the consumption of fish contaminated with Site-related chemicals, 2) prevention of humans and aquatic organisms from direct contact with sediment within the slough, 3) prevent or minimize the migration of contaminants from the slough into the surface water column and groundwater. An upcoming sampling program will confirm or disprove this assertion. The only RAO likely to not be substantially achieved to date will be to allow for the full attainment of the beneficial uses of surface waters in the area of the Site (including fish/shellfish harvesting) because fish may still have dioxin in their tissues from before the slough was capped.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Answer: No other information has come to light that could call into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and information obtained from the site inspection, the implemented sediment remedy is functioning as intended by the ROD as amended by the ESD. There have been no changes in the ARARs nor TBCs that should affect the protectiveness of the remedy. The remedy remains protective of human health and the environment. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

There are no known significant issues which would call into question the protectiveness of the implemented remedy, that of in-situ capping and ancillary work within/adjacent to Old Mormon Slough. An issue with potential health ramifications is that occasional trespassers have been observed fishing along the banks of the slough despite access restrictions and warning signs about the possible health risks associated with consuming fish caught in this area. If fish from the slough are consumed, then dioxin and potentially other COCs that were taken up by fish prior to the capping could pose an elevated risk to the consumer. Minor physical safety issues requiring action include repair of the damaged Site perimeter fencing, and replacement of several weather-damaged and/or otherwise unreadable signs. The chosen soils remedy should be implemented by the end of 2009. In the meantime, work will proceed toward the goal of developing a revised remedy for the groundwater OU. As a part of this effort, field work to evaluate the potential for vapor intrusion from site soils and groundwater will occur.

IX. Recommendations and Follow-up Actions

It is recommended that Site fencing be repaired, and that it continues to be routinely checked for signs of damage or vandalism. Also, warning signs should be replaced if damaged or illegible. These recommended follow-up actions to non-critical issues should be completed as soon as practical by EPA, in lieu of a financially viable PRP.

X. Protectiveness Statement(s)

The implemented surface and sediment remedy at the McCormick and Baxter Superfund Site is protective of human health and the environment from risks posed by contaminated sediments in Old Mormon Slough. Protectiveness statements regarding the soil and groundwater OUs are deferred until after their respective remedy implementation.

XI. Next Review

The next Five-Year Review report for the McCormick and Baxter Superfund Site is required in 2013, five years from the date of this review.

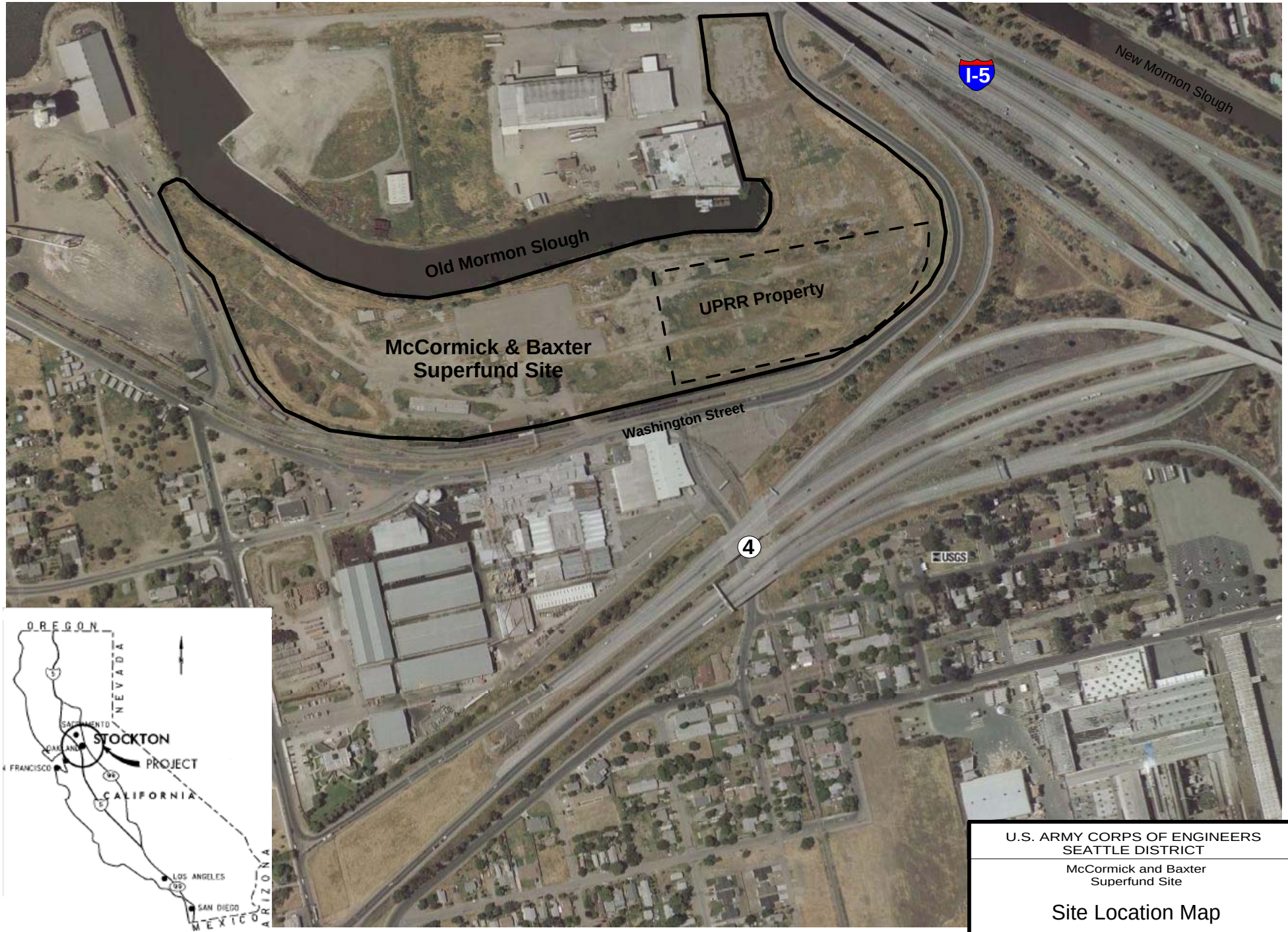
Figures

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site

Principal Source Areas

STOCKTON	Figure 2	CALIFORNIA



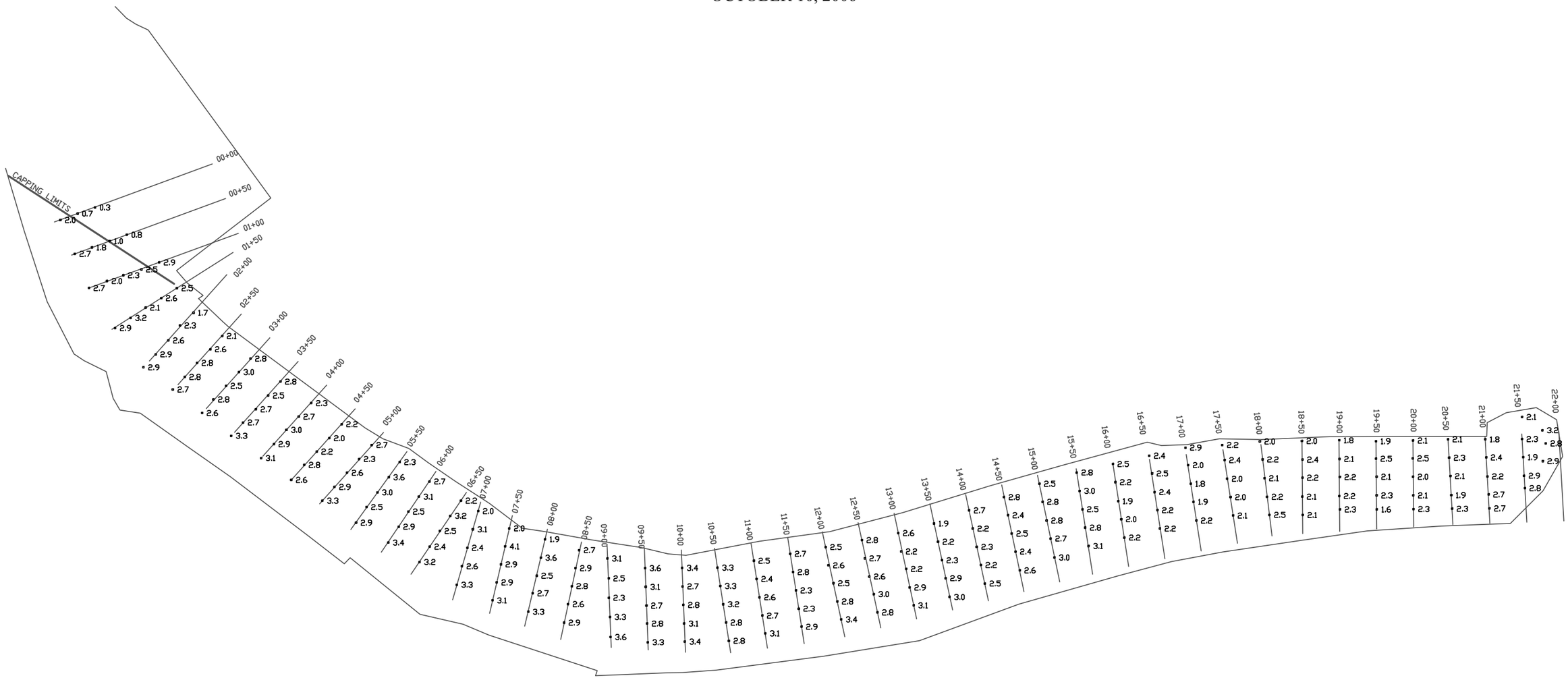
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

McCormick and Baxter
Superfund Site

Site Location Map

STOCKTON	Figure 1	CALIFORNIA

McCORMICK & BAXTER
PHASE II - SEDIMENT CAP CONSTRUCTION
J.E. McAMIS INC.
FINAL CAP SURVEY
OCTOBER 10, 2006



ISOPACH COMPARISON BETWEEN PRE-CAP BOTTOM ELEVATIONS AND OCTOBER 10, 2006 PROGRESS SURVEY
VALUES INDICATE CHANGE IN BOTTOM ELEVATIONS AT THAT LOCATION

NORTHWEST HYDRO INC.
31 COUGAR CREEK RD.
SKAMANIA, WA 98648
PH (509) 427-5081
EMAIL: NWHYDRO@SAW.NET

Attachment 1

List of Documents Reviewed

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LIST OF DOCUMENTS REVIEWED

Battelle Pacific Northwest Laboratories, 1998. Surface Water-Sediments Feasibility Study Report. July 1, 1998. Prepared for USEPA.

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ICF Kaiser Engineers, Inc., 1999. Soils and Groundwater Feasibility Study Report, McCormick and Baxter Superfund Site, Stockton, CA. April 1999. Prepared for USEPA.

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USACE 2007b. Final Groundwater Remedy Focused Feasibility Study. Risk Assessment Technical Memorandum. McCormick and Baxter Superfund Site Stockton, CA.
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US EPA. 2004. National Register of Historic Places Eligibility Evaluation of a Former 1928 Oil Screw River Scow. Prepared by Macfarlane Archaeological Consultants.

US EPA. 2003 . Exposure and Human Health Reassessment of 2,3,7,8-Tetraachlorodbenzo-*p*-Dioxin (TCDD) and Related Compounds, NAS Review Draft. EPA/600/P-00/001Cb .

USEPA, 2002. Fact Sheet: EPA Begins Cleanup Action for Sediment Contamination, McCormick and Baxter Superfund Site. October 2002.

USEPA, 2000. Fact Sheet: EPA Continues Remedial Design for Soil, Groundwater and Sediment Contamination, McCormick and Baxter Superfund Site. May 2000.

USEPA, 1999. Fact Sheet: EPA Signs Record of Decision and Begins Remedy Design for Cleanup Plan (M&B, Stockton, CA). July 1999.

USEPA, 1999. Record of Decision, McCormick and Baxter Superfund Site, Stockton, CA. March 31, 1999.

USEPA, 1998. Fact Sheet: EPA Announces Proposed Cleanup Plan for the McCormick and Baxter Superfund Site. September 1998.

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Attachment 2

Site Inspection Report (Checklist format), with Photographs

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SITE INSPECTION REPORT

MCCORMICK AND BAXTER SUPERFUND SITE, STOCKTON, CA
(EPA ID: CAD009106527)

I. INTRODUCTION/SITE INFORMATION:

USEPA Region 9 is the lead agency for conducting the five-year review. The Seattle District, US Army Corps of Engineers (USACE) is assisting EPA with this review. USEPA Region 9 is the lead agency for remediation of the site, with California EPA/Department of Toxic Substances Control (Cal EPA/DTSC) acting as the support agency.

The McCormick and Baxter Superfund site is located at 1214 West Washington Street in Stockton (San Joaquin County), California. The site occupies approximately 32 acres in a predominantly industrial area near the Port of Stockton and the junction of Interstate 5 and State Highway 4. The northern boundary of the site is formed by Old Mormon Slough, which connects to the Stockton Deepwater Channel on the San Joaquin River. Other site boundaries include Washington Street to the south, Interstate 5 to the east, and an industrial facility located at the Port of Stockton Turning Basin to the west (see Figure 1). An eight-acre parcel in the southeastern portion of the site is owned by the Union Pacific Railroad (UPRR). The site is secured by a combination of older chain link and barbed wire fence attached to wood posts, and newer galvanized steel chain link fence topped with barbed wire. The McCormick and Baxter Creosoting Company operated from 1942 until 1991. Various wood preservation processes were used at the site during its operational history. The treated wood products were used primarily by power utilities, railroads, and the construction industry. Preservatives included creosote, pentachlorophenol (PCP), arsenic, copper, chromium, and zinc. Solvents or carriers for these preservatives included petroleum-based fuels, such as kerosene and diesel, butane, and ether.

The site has been divided into two operable units (OU): 1) upland soil and groundwater, and 2) sediment and surface water in Old Mormon Slough. Remedial investigations and feasibility studies have been previously prepared for both operable units, with the selection of remedies documented in the site's Record of Decision (USEPA 1999a). US EPA Region 9 began groundwater investigations at the McCormick and Baxter Site after the site was listed on the National Priorities List (NPL) in 1992.
To date, 14 groundwater OU sampling events have been conducted on site by USACE for USEPA. Annual and/or semiannual dissolved-phase groundwater monitoring continues to provide critical information to address groundwater data gaps. In addition, a sediment cap has been placed in the OU 2 slough.

On 7 and 8 April 2008, Joseph Marsh (Seattle District, USACE) conducted a formal five-year review site inspection to be included in the Five-Year Review Report. He was present on site between 11 a.m. and 5:30 p.m. on 7 April, and 7:30 a.m. and 11 a.m. on 8 April 2008. Mr. Marsh has conducted groundwater sampling investigations at the site since 1999 and possesses significant knowledge of recent and historical site activities. US EPA Region 9 Remedial Project Manager, Patricia Bowlin, participated in the site inspection and interviews between

approximately 12:30 p.m. and 5:00 p.m. on 7 April, 2008. The purpose of the site inspection was to record site and vicinity observations, deficiencies, and other issues, then conduct interviews with individuals familiar with the site. The site inspection included: Old Mormon Slough and near-shore conditions as well as the sheetpile wall and downstream logboom; site surface conditions in preparation for the soil remedy including the previously placed asphalt cap; on-site surface water collection system; and access controls. The weather was clear and warm (approximately 75° F) with a light breeze during the site inspections. In compliance with five-year review guidance, this report follows the site inspection checklist format.

Figure 1: McCormick and Baxter Superfund Site Aerial Photograph

II. INTERVIEWS:

1) **Robert Mentelos, Supervisor, Penny Newman Grain Inc., (209) 482-6919.**

Joseph Marsh and Patricia Bowlin interviewed Robert Metelos in his office at approximately 2 p.m. on 7 April 2008. His general impression of the property is that it should not be left a vacant lot. He expressed an interest in leasing or purchasing the McCormick and Baxter site for Penny Newman activities, and wants to continue conversations with EPA to make that happen. He has been kept updated on site contamination issues through annual communications with USACE during scheduled groundwater sampling events. He expressed no concerns about site contaminants, and recommended EPA talk to James Taylor with the Continental Company to find out more information about a diesel oil leak on or near Penny Newman property (At this time, there is no clear evidence the diesel leak impacts the McCormick and Baxter site groundwater). He reported seeing trespassers walking across the site and even on the logboom installed to close off the slough. According to Mr. Mentelos, the county police have been called on several occasions when trespassers were seen. He demonstrated their video surveillance

system allowing him to easily monitor the western portion of the McCormick and Baxter site. He also noted broken or sagging areas of security fencing along the Penny Newman side of the McCormick and Baxter site allowing trespassers easy access to the slough. He said fires have been set by trespassers, and others were seen fishing along the banks of the slough. Mr. Mentelos was not aware of any community concerns, or if the site has any real effect on the community. He commented on the good communications on site activities via regular contact with USACE representatives. At the conclusion of the interview, Mr. Marsh and Ms. Bowlin updated Mr. Mentelos on the upcoming work related to the soil remedy so the company would not be surprised to see truck traffic and construction activities in their vicinity.

2) Lew Watkin, Supervisor, California Cedar Products Co. (209) 992-1883.

Joseph Marsh and Patricia Bowlin interviewed Lew Watkin in the McCormick and Baxter site office at approximately 1 p.m. on 7 April 2008. Mr. Watkin expressed no opinion of the project. He stated he would have no idea of the effect of the site and site contamination on the local community, and is not aware of any concerns the community may have. He continued by stating he is not aware of any incidents of vandalism, but is aware of trespassers crossing the McCormick and Baxter site to go fishing in the slough. He did offer to coordinate with USEPA and USACE on site security issues in the future since his guards are on duty around the clock and can easily observe the site from their guard house. He noted the good communications on site activities via regular contact with USACE representatives. At the conclusion of the interview, Mr. Marsh and Ms. Bowlin updated Mr. Watkin on the upcoming work related to the soil remedy so the company would not be surprised to see truck traffic and construction activities in their vicinity.

3) Bill Catlett, McCormick and Baxter Site Maintenance Lead, ITSI, (209) 471-2672.

Joseph Marsh interviewed Bill Catlett via email, and then in person at his city water department office at approximately 11 a.m. on 8 April 2008. Mr. Catlett is most familiar with all aspects of the site since he is a former employee of the McCormick and Baxter Company at this location. Mr. Catlett also works nearby for the City water department. He is not aware of any community effects or concerns. The only serious incidents he is aware of is the routine site trespassers seen crossing the site to go fishing in the slough. He has also repaired the security fence numerous times where trespassers have cut their way through. During the interview, he also commented on being asked by USEPA Region 9 to monitor the condition of the derelict barge and boat in the slough owned by local resident Herman Miller. Mr. Catlett has moved the barge several times after it had broken free of its moorings (the barge and boat are now sitting on the site property. Mr. Catlett noted he uses a tractor to mow the site as needed, and maintains the utilities when needed. He reported the water line is problematic, but serviceable, and the electric and sewer connections are fine. Mr. Catlett also stated he is working with UPRR to ensure they repair a section of security fence knocked down during installation of a railroad spur along the eastern margin of the site. (Note: fence repairs had not been made during the site inspection period.) He offered no other comment on the site or site conditions.

4) Craig King, Site Security Guard, ITSI, (888) 545-ITSI.

Joseph Marsh interviewed Craig King in the McCormick and Baxter site office at approximately 10 a.m. on 8 April 2008. Mr. King had no opinion or comment on community concerns or

effects in regards to the site. He was aware of the nature of the site contamination. His main concern was site trespassers cutting the security fence to allow them access to the slough. He has never witnessed anyone on-property, but has seen cut fence and empty beer bottles near the slough. Mr. King stated he reports directly to Mr. Catlett when he notices a break in the security fence. Mr. King had no additional comments on the site.

5) Ray Ipezza, Local Resident, Animal Caretaker (no phone number provided).
Joseph Marsh and Patricia Bowlin interviewed Ray Ipezza outside in front of the McCormick and Baxter site office at approximately 4 p.m. on 7 April 2008. Mr. Ipezza has been feeding and caring for dogs that live on the McCormick and Baxter site for many years. He reported no knowledge of any community concerns or effects in relation to the site. He has been made aware of site contamination issues during his many years feeding dogs here. His main concern was for the welfare of the last remaining dog (that actually sleeps in the office building) after building demolition and completion of the soil remedy. He said he may be forced to have the animal euthanized.

III. ON-SITE DOCUMENTS AND RECORDS:

Copies of the following documents were located in the McCormick and Baxter field office: draft focused feasibility study management plan; site specific-safety and health plans with maps to the hospital; groundwater sampling plans and addendums; groundwater data reports; wastewater discharge plans and permits; daily access and security logs; and emergency contacts with phone numbers.

IV. O&M COSTS:

Operations and Maintenance at the McCormick and Baxter site is limited to 24-hour site security and routine maintenance activities. Site O&M is performed by Innovative Technical Solutions, Inc. (ITSI) under contract to the Sacramento District, USACE for an average monthly cost of approximately $25,000. The 24-hour guard service consists of at least one individual per shift who makes routine site perimeter inspection walks. Site maintenance is performed by one individual who was formerly employed by the McCormick and Baxter Company. The maintenance consists of minor repair work required to keep the utilities functioning, chain-link fencing repaired, and the on-site grass and weeds mowed prior to the annual sampling events. In addition, O&M includes stormwater management, testing and discharge as required.

V. ACCESS AND INSTITUTIONAL CONTROLS:

As stated in the introduction, the site is secured by a combination of older chain link and barbed wire fence attached to wood posts, and newer galvanized steel chain link fence topped with barbed wire. Warning/danger signs and a 24-hour guard service supplement the security fencing. However, once the buildings are removed from the site, the guard service will most likely be terminated. Several danger signs need to be reinforced since their securing wires have rusted out. In addition, the main entry chemical warning signs have been bleached out by the sun and must be replaced since they are unreadable (photo 1). The site access gate is left unlocked during daylight hours only, and in addition, a secondary locked security fence is situated around the parking area to further restrict site access. Six locked gates are also situated at points around the perimeter of the site fence to permit vehicle access, but are normally not used except for the one closest to the office immediately east of the main access gate. That particular gate is only

wired shut – it is missing a lock for unknown reasons. One locked personnel access gate is situated north of the central asphalt cap along the slough shoreline security fence. During the site inspection, five damaged or cut areas (photo 6) were discovered in the security fencing in locations shown at the arrows in Figure 2 below:

Figure 2

VI. GENERAL SITE CONDITIONS:

Joseph Marsh and Patricia Bowlin conducted the site inspection survey on 7 April 2008. Site features were inspected from the parking area, then moving clockwise to the debris piles, stormwater detention pond, eastern boundary, slough shoreline, existing asphalt cap/central area, eastern (UPRR) property, then back to the office.

The unpaved main access gate area is rutted and damaged by loaded railroad tank cars passing by on a daily basis. However, the unpaved road is still useable at this time. The entry gate has been hit by vehicles or equipment over the years, but remains useable. The unpaved parking area appears to be in fair condition, but as stated previously, the eastern site access gate is wired shut and not padlocked as required.

The office building appeared to be in fair condition with no obvious hazards to human occupants found. The former EPA lab trailer is still situated immediately west of the office building. A long, wooden shed is situated against the south security fence, and contains file cabinets, drums, a truck, and assorted waste.

Moving west of this area, numerous concrete footings, pipes, pumps, debris, and utility poles mark the flat landscape. West of those features, another long wooden shed houses numerous

IDW drums awaiting disposal (photo 3). West of the shed, large debris stockpiles from slough dredging and capping work, dominate the area (photo 4).

Southwest of the debris piles, a large earthen berm topped with security fencing and warning signs marks the location of the wastewater detention pond (photo 16). The pond was empty during the inspection period, and apparently contains no liner to effectively block migration of wastewater down through the soil and into groundwater.

Continuing west of the detention pond, obvious damage to security fencing was observed and photographed (photo 8). In addition, footprints were seen leading to the slough thereby verifying stories of people seen fishing from the site shoreline. Black Widow spiders, ticks, snakes and other biological hazards were not seen here.

Looking north at the slough entrance, the floating logboom appeared to be working as designed – no damage noted. The steel sheetpile wall appeared to be holding up extremely well (refer to Section VIII). Overall, the slough and constructed rip-rap banks appeared to be in very good condition. No sloughing, slumping, or erosion was detected throughout the shoreline inspection (photos 10 and 11). No sheen or floating product was observed on the surface of the slough during the inspection period.

New security fencing installed after the slough capping work was observed to run from the far northwest corner of the property, running along the top of the south bank (north site edge) all the way around the slough perimeter to the Stockton Cold Storage facility. One break was seen in this relatively new fence, and one recent repair (photos 6 and 12).

Concluding the western half of the site inspection, observations noted no obvious contamination, and no serious deficiencies or unusual findings except for the dry stormwater pond, and damaged security fencing. Site access roads are still useable. Dominant west half site features included: few mature palm and deciduous trees; well marked groundwater monitoring wells; concrete footings; concrete pads; steel piping; mixed wood, metal, and plant material; and Old Mormon Slough material debris stockpiles situated on flat, dry, grassy terrain with weeds and grasses growing to knee high at this time. The dominant weed appears to be the Star Thistle. Black Widow spiders, ticks, and snakes were not seen here.

NOTE: In regard to the debris stockpiles, there has been no sampling and analysis of the stockpiled material performed as of this writing. UPRR property contractor ARCADIS is responsible for the soil, concrete and vegetative debris from the sediment cap. USEPA Region 9 is responsible for some of the miscellaneous debris associated with the sediment cap, the soil cuttings from the groundwater well installations and the left over McCormick and Baxter site debris. Debris stockpile sampling, analysis, and off-site disposal will occur during late summer 2008.

Moving east toward the center of the project site, a large asphalt cap (see Figure 1 and photo 9) dominates the terrain. This capped area is raised at least one foot higher than surrounding terrain with the north and south sides of the cap higher in elevation than the center to facilitate stormwater drainage to a catch basin. The cap integrity has not been compromised and appears

to be in good condition. The other major feature here is a dilapidated small wood-frame building. In this vicinity, the only locked personnel gate access through the security fence to the slough can be found. No obvious contamination, serious deficiencies, or unusual findings were noted in the central area. Site access roads are still useable. Dominant central site features included: few mature deciduous trees; well marked groundwater monitoring wells; few concrete footings; concrete pads; steel piping; scattered wood, and metal debris situated on flat, dry, grassy terrain with weeds and grasses growing to knee high at this time. The dominant weed appears to be the Star Thistle. Black Widow spiders, ticks, snakes and other biological hazards were not seen here. This is the most secure area on the site with access limited through the office building or two vehicle gates near the adjacent parking area.

Continuing the inspection toward the eastern site boundary (into UPRR property) damaged fencing included: results of recent railroad construction (photo 14); general damage to gain entry at a gate (photo 13); and recent fence damage repair (photo 12) was observed. No obvious contamination, serious deficiencies (other than fence damage), or unusual findings were noted in the eastern area. Site access roads are still useable. Dominant eastern site features included: few scattered mature deciduous trees; well marked groundwater monitoring wells; few concrete footings; concrete pads; rail tracks; steel piping; scattered wood, and metal debris situated on flat, dry, grassy terrain with weeds and grasses growing to knee high at this time. The dominant weed also appears to be the Star Thistle. Black Widow spiders, ticks, snakes and other biological hazards were not seen.

Moving back west toward the office building to complete the site inspection, Herman Millers' barge remnants, office trailer, container, metal, floatation material, and sailboat have been placed on flat, grassy terrain adjacent to the eastern security fence of the site parking area (photo 19).

VII. LANDFILL COVERS: Not applicable.

VIII. VERTICAL BARRIER WALLS:

The steel sheetpile wall located at the northwest end of the property – along the shoreline southwest of Old Mormon Slough – appeared to be in good condition with only a fine, even coating of rust covering all exposed surfaces (a natural occurrence). No settlement, deflection, bowing, or distortion of any kind could be identified in the sheetpile sections after careful visual inspection (photo 10). Regular scheduled performance monitoring is not needed at this time.

IX. GROUNDWATER/SURFACE WATER REMEDIES:

Dozens of groundwater monitoring wells located on site are secure, and functioning as required. All appear to be in good condition but may have to be protected, raised, moved, or abandoned in preparation for the soil remedy work. Thirty (30) of the site monitoring wells are routinely sampled by USACE personnel and are promptly repaired as needed. Most of the wells contain dedicated Teflon bladder pumps to facilitate representative sample collection. Microwells contain Teflon lined polyethylene tubing.

Surface water runoff during the limited rainy season is actively captured on-property. Several stormwater catch basins are situated in strategic locations throughout the site, and serve to

transfer surface water to a pumping station on the west side of the site. The pumping station is checked for functionality by the site maintenance contractor, Bill Catlett, on a regular basis. The pumping station can capture surface water runoff and temporarily store a small volume, or immediately divert it to the adjacent stormwater detention pond. The pond is unlined, and was found to be dry during the site inspection as previously noted. All pumps, collection structures, pipelines, valves, and other equipment have been rated as satisfactory by Mr. Catlett. He reported having to sample, analyze, and discharge stormwater only one time since 1999. It is possible that some of the captured water is lost to infiltration and evaporation since it will be held for long periods of time.

X. OTHER REMEDIES: Not applicable at this time.

XI. OVERALL OBSERVATIONS:
Overall, the main deficiency discovered was damaged fencing and a few warning signs requiring replacement. In addition, weeds and grasses should be mowed to limit possible wildfire damage during the dry summer months. No settlement or erosion issues exist on the site at this time. The site as a whole appears relatively unchanged since placement of the waste material stockpiles and Herman Miller's property on the site.

Upcoming field work scheduled for summer 2008 should determine if the sediment cap remedy is effective in the slough. Also, completion of site clearing and soil capping work should complete the soil remedy. Post construction investigations should determine if the soil remedy is effective and functioning. A groundwater remedy has not been selected at this time, therefore no comment can be made to groundwater remedy effectiveness and functionality.

Seattle District, USACE will incorporate the information collected during the site inspection into the first Five-Year Review Report.

Joseph R. Marsh
Environmental Protection Specialist
CENWS-EC-TB-GE

Photo 1: Main access gate condition - unlocked during the day. Note sun-bleached hazard signs needing replacement.

Photo 2: Typical danger sign placed on security fence facing in and out.

Photo 3: Over 280 55-gallon IDW drums remain on site requiring disposal prior to performing the soil remedy.


Photo 4: Dredged slough waste material requiring proper disposal prior to performing the soil remedy.

Photo 5: Site view looking west along site access road. Debris piles are visible.

Photo 6: Typical cut in security fence for trespassers to access the slough.

Photo 7: Logboom installed to block access to the slough appeared to be in good condition.

Photo 8: Far west end of site. Older style chain link and barbed wire fence damaged by trespassers.

Photo 9: Existing asphalt cap placed near the center of the site. Monitoring wells are also visible on the left.

Photo 10: Sheetpile wall and slough conditions. Sheetpile appeared to be in good condition.

Photo 11: General site conditions – east end of slough. Slope rip-rap shown in good condition.

Photos 12 and 13: Photo 12 shows a typical fence repair. Photo 13 shows a damaged gate allowing potential access for trespassers.

Photo 14: Damaged fencing on east end of property caused by UPRR construction.

Photo 15: General site view of east half of site (UPRR Property).

Photo 16: Empty stormwater detention pond.

Photos 17 and 18: Photo 17 shows stormwater pumping station. Photo 18 shows typical stormwater collection drain located on the east end of the site.

Photo 19: Personal property consisting of containers, office trailer, barge remnants, metal material, and sailboat placed adjacent to east parking area fence.

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Attachment 3

Technical Memorandum
Applicable and Relevant and Appropriate Requirements Review
First Five Year Review
McCormick and Baxter Superfund Site
Stockton, CA

Prepared for:
US Environmental Protection Agency
Region 9
Prepared by:
Department of the Army
US Army Corps of Engineers
Seattle District

Revised June 26, 2008

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1. Purpose

The purpose of this document is to provide a review of legal compliance-related changes in support of the U.S. Environmental Protection Agency (EPA) for the First Five-Year Review of the McCormick and Baxter Superfund Site, a former wood-treating facility, located in Stockton, CA (Figure 1-1). EPA is the lead agency for remediation of the site, with California EPA/Department of Toxic Substances Control (Cal EPA/DTSC) acting as the support agency.

1.1 Site Description

The McCormick and Baxter Superfund site occupies approximately 32 acres in a predominantly industrial area near the Port of Stockton and the junction of Interstate 5 and State Highway 4 (Figure 1-1). The northern boundary of the site is formed by Old Mormon Slough, which connects to the Stockton Deepwater Channel on the San Joaquin River. Other site boundaries include Washington Street to the south, Interstate 5 to the east, and an industrial facility located at the Port of Stockton Turning Basin to the west. An eight-acre parcel in the southeastern portion of the site is owned by the UPRR.

The McCormick and Baxter Creosoting Company operated at 1214 West Washington Street in Stockton, California, from 1942 until 1991. Various wood preservation processes were used at the site during its operational history. The treated wood products were used primarily by power utilities, railroads, and the construction industry. Preservatives included creosote, pentachlorophenol (PCP), arsenic, copper, chromium, and zinc. Solvents or carriers for these preservatives included petroleum-based fuels, such as kerosene and diesel, butane, and ether.

Most treatment processes consisted of pressure impregnation of the preservative solutions in retorts. Pressure-treated wood was removed from the retorts and allowed to dry in various wood storage areas throughout the site. The primary facility areas identified as principal sources of contamination at the site include the Main Processing Area, Oily Waste Ponds Area, Cellon Process Area, and PCP Mixing Shed/Butt Tank Area.

The former processing areas and tank farm at the site are paved. The rest of the site is unpaved, with limited vegetative cover. Railroad tracks are located on many areas of the site. Most of the former structures have been removed. An office building, two storage sheds, a storm water collection system lift station, remnants (i.e., foundation and building, not a tank) of a gas station, wooden tower, and a building near the tower are the only remaining above ground structures. Underground sump-like basement foundations and associated piping for the former pressure treatment units remain in the central portion of the site. Entry to the site is controlled by a perimeter fence and 24-hour security service.

The site is located on the margin of the Sacramento River–San Joaquin River Delta in the Great Valley geomorphic province of California. The site terrain has low relief, with elevations ranging from 8 to 15 feet above mean sea level. Surface water bodies in the vicinity of the site

include Old Mormon Slough, New Mormon Slough, the Stockton Deepwater Channel, and the San Joaquin River. Old and New Mormon Sloughs are tidally influenced and experience a maximum tidal range of approximately 3 feet. Stockton Channel, the Port of Stockton Turning Basin, and Old Mormon Slough are areas of net sediment deposition, and all but the inner portion of Old Mormon Slough are periodically dredged to maintain depths appropriate for ship traffic. Old Mormon Slough is approximately 2,500 feet long and 160 feet wide. Following remedial capping, the slough next to the property is now approximately 6 to 14 feet deep.

1.2 Operable Units Description and History

The site has been divided into two operable units (OU): 1) upland soil and groundwater, and 2) sediment and surface water in Old Mormon Slough. Remedial investigations and feasibility studies have been previously prepared for both operable units, with the selection of remedies documented in the site's Record of Decision [1].

EPA began groundwater investigations at the McCormick and Baxter Site after the site was listed on the National Priorities List (NPL) in 1992. Human health and ecological risk assessments and a Remedial Investigation (RI) were completed in 1997 and 1998, and a Feasibility Study (FS) [2]was completed in 1999. The ROD did not establish groundwater cleanup goals because the contamination pump and treat remedy at the site was determined to be interim, and has not been implemented due to the apparent stability of the contaminant plume.

Annual dissolved-phase groundwater monitoring continued after the ROD, as well as targeted investigations to address groundwater data gaps. These included an extensive two-year (1999-2000) investigation to characterize the distribution of non-aqueous phase liquids (NAPL) at the site. Additional wells were installed over the years to monitor the extent of NAPL and dissolved-phase contamination.

In order to comprehensively evaluate in-situ thermal technologies for groundwater remediation, a Thermal Treatment Technology Conceptual Design was completed in November 2001. This document became the basis for an Agency Review Draft Groundwater Focused Feasibility Study (Draft FFS) in August 2002 [3]. The Draft FFS compared several in-situ thermal technology scenarios with a containment alternative (hydraulic control via pump and treat), a limited action alternative (of which monitored natural attenuation was a component), and a no action alternative. Natural attenuation parameters were sampled in select monitoring wells beginning in 1999. In November 2004, Draft Monitored Natural Attenuation Plan was produced [4]. The purpose of the Plan was to identify and address data gaps necessary to fully evaluate natural attenuation as a remedial alternative. In 2007, the US Army Corps of Engineers completed a

[1] USEPA. 1999a. Record of Decision, McCormick and Baxter Superfund Site, Stockton, California. EPA Region 9. March 1999.
[2] ICF Kaiser Engineering, Inc . 1999. Soils and Groundwater Feasibility Study Report, McCormick and Baxter Superfund Site, Stockton, California. Prepared for EPA by ICF Kaiser Engineering, Inc.
[3] US Army Corps of Engineers. 2002. Soils and Groundwater Focused Feasibility Study Report, McCormick and Baxter Superfund Site, Stockton, California. Agency Review Draft. Prepared for USEPA by USACE.
[4] USACE 2004. Draft Work Plan for Additional Data Collection Proposed for Evaluation of Natural Attenuation as a Remedial Alternative

Management Plan [5] to define a path forward for selecting the final groundwater remedy, and is currently collecting and analyzing further samples at this writing.

Concurrent with development of the interim groundwater remedy, EPA has implemented cleanup plans for contaminated sediment in Old Mormon Slough and surface upland soil. The sediment cleanup remedy selected in the ROD was the placement of a two-foot thick cap of clean sand in Old Mormon Slough. Capping was performed following stabilization of the southern banks and end of the Slough to prevent migration of contaminated soils into the slough. The sediment cap was placed during the summer of 2006. The cap covers about three-quarters of the slough and all surface-contaminated area adjacent to the property. Additionally, a log boom was installed at the outer end of the slough to prevent boat traffic from entering and damaging the cap, and to exclude fishermen.

EPA has reached a negotiated settlement with Union Pacific Railroad (UPRR), which owns a portion of the Site, to complete the site-wide soil remedy to supplement EPA's containerization of the wastes from the principal threat waste area, those areas of the Site (i.e., the central processing area, track pit, tank farm, butt tank area, and oily waste ponds). The soil remedy consists of moving all contaminated surface soil from the eastern half of the site to the more contaminated western half of the site. After this, the eastern half will be back-filled with clean soil and the western half, with consolidated contaminated soil, will be covered with a permanent asphalt cap. A preliminary design is underway, and construction will be finished in about one year.

This document targets the activities at the site during the five years following the ROD and initiation of remedial actions since the focus of the site remedial activity has been the cleanup of the Surface Water-Sediment OU.

The ROD established in-place capping of sediment in Old Mormon Slough to mitigate risks from chemicals released into sediment. The remedial goals were to:

- Reduce potential risks to human health from the consumption of fish contaminated with Site-related chemicals
- Prevent humans and aquatic organisms from direct contact with sediment having contaminants in excess of risk-based concentrations or that have been shown to be toxic to aquatic organisms
- Prevent or minimize the migration of contaminants from Old Mormon Slough sediments into the surface water column
- Prevent or minimize the migration of contaminants from Old Mormon Slough sediments to groundwater
- Allow full attainment of the beneficial uses of surface waters in the area of the Site, including fish and shellfish harvesting and the protection of aquatic life and wildlife.

[5] USACE. 2007. Draft Management Plan for the Final Groundwater Remedy Focused Feasibility Study.

In 2005, EPA published an Explanation of Significant Differences (ESD), [6] in which it determined a need to stabilize the banks of the slough wherever contaminated soil was located since the banks were eroding into the slough, and could have provided a continuing source of recontamination to surface sediment and water even after the sediment cap was in place. The ESD also determined the need to relocate an individual living on a barge in the slough in order to implement the sediment remedy and to ensure that the constructed cap would not be damaged by the continued presence of the barge.

The cap was designed to physically isolate the contamination in place, burying the contamination to prevent direct contact to benthic organisms and re-suspension of the sediment, and decreasing the bioavailability of the contamination to water column organisms. Evaluations indicated that, due to the low solubility and high sorption properties of PAH and dioxins, they could be adequately contained by a permeable cap. Following capping, the concentration of Site-related contamination in resident fish is expected to decrease over time, thus reducing risk to humans. According to the ROD, long-term monitoring, maintenance and institutional controls are required to ensure the integrity of the cap.
Definitions of Applicable, Relevant and Appropriate Requirements, (ARAR) and To Be Considered (TBC) Materials.

The following quotes from the CERCLA Compliance with Other Laws Manual, although the order of the paragraphs varies slightly. [7]
"CERCLA §121 requires selection of a remedial action that is protective of human health and the environment. EPA's approach to determining protectiveness involves risk assessment, considering both ARARs and to-be-considered materials (TBCs). The risk assessment includes consideration of site-specific factors such as types of hazardous substances present, potential for exposure, and presence of sensitive populations. Acceptable exposure levels are generally determined by applicable or relevant and appropriate Federal and State environmental requirements, if available….

"Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

"Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

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[6] US EPA. 2005. Explanation of Significant Differences: MCCORMICK & BAXTER CREOSOTING CO. EPA/ESD/R09-05/048. EPA ID: CAD009106527, OU 03, Stockton, CA

[7] EPA 1988. *CERCLA Compliance with Other Laws Manual: Interim Final.* Office of Emergency and Remedial Response. EPA/540/G-89/006

"The determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant and (2) determination if a requirement is appropriate. In general, this involves a comparison of a number of site-specific factors, including the characteristics of the remedial action, the hazardous substances present at the site, or the physical circumstances of the site, with those addressed in the statutory or regulatory requirement. In some cases, a requirement may be relevant, but not appropriate, given site-specific circumstances; such a requirement would not be ARAR for the site. In addition, there is more discretion in the determination of relevant and appropriate; it is possible for only part of a requirement to be considered relevant and appropriate in a given case. When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.

"**To-be-Considered Material** (TBCs) are non-promulgated advisories or guidance issued by Federal or State government that are not legally binding and do not have the status of potential ARARs. However, as described below, in many circumstances TBCs will be considered along with ARARs as part of the site risk assessment and may be used in determining the necessary level of cleanup for protection of health or the environment.

"There are several different types of requirements that CERCLA actions may have to comply with. The classification of ARARs below was developed to provide guidance on how to identify and comply with ARARs; however, some requirements may not fall neatly into this classification system.

- Ambient or *chemical-specific* requirements are usually health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.
- Performance, design, or other *action-specific* requirements are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes.
- *Location-specific* requirements are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations.

"ARARs will define the cleanup goals when they set an acceptable level with respect to site-specific factors. For example, MCLs under the Safe Drinking Water Act are normally acceptable levels for specific contaminants. However, cleanup goals for some substances may have to be based on non promulgated criteria and advisories (for example, health advisories such as reference doses (RfD)) rather than on ARARs because ARARs do not exist for those substances or because an ARAR alone would not be sufficiently protective in the given circumstances, e.g., where additive effects from several chemicals are involved. In these situations, the cleanup requirements, in order to meet the cleanup goals, will not be based on ARARs alone but also on TBCs. Similarly, State criteria, advisories, and guidance should also be considered for the State in which a site is located.

"ARARs (and …TBCs) must be attained for hazardous substances remaining on-site at the completion of the remedial action. In addition, EPA intends that the implementation of remedial

actions should also comply with ARARs (and TBCs as appropriate) to protect public health and the environment. All remedial actions should attain action-specific requirements that have been identified as ARAR while the remedial action is being conducted, unless a waiver is justified. However, if ARARs are not being met before the commencement of a remedial action, it is not necessary to invoke a waiver to justify their non-attainment during the action."
Characteristics of all ARARs is that they:

- Are promulgated and legally binding [8]
- Are related to an environmental or facility-siting law
- Are substantive ("are requirements that pertain directly to actions or conditions in the environment")
- Apply to a circumstance encountered at a CERCLA site, or to a situation sufficiently similar to a requirement that it is suited for a CERCLA site [9]
- Constitute a cleanup standard, standard of control, or other requirement that specifically addresses a hazardous substance [10], pollutant or contaminant [11], remedial action, location, or other circumstance found at a CERCLA site.

2. ARAR Determinations – McCormick & Baxter Site

This memorandum deals mainly with the Sediment and Surface Water OU, because the ROD did not identify final ARARs nor TBCs, nor did it establish *in-situ* groundwater cleanup standards; and there has been no action in the last five years regarding the Soils OU. (Activities will occur in the next five-year period.) In the case of groundwater, final ARARs are deferred until the selection of the final groundwater remedy.

2.1 Chemical Specific ARARS and TBC Materials for the sediment and surface water OU

Cleanup objectives are established in part by chemical-specific Federal or more stringent state-promulgated criteria. In the absence of ARARs, "to-be-considered" (TBC) criteria may be used in the development of cleanup standards. Where there are no ARARs or where the ARARs are found by EPA to be unprotective**,** site-specific risk-based estimates of groundwater concentrations that are predicated to be protective of human health and the environment are used to develop numerical cleanup standards**.** The National Contingency Plan (40 CFR 300) states that for carcinogenic contaminants, "acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}." For noncarcinogens, a hazard index of 1 or less is considered an acceptable exposure level.

[8] CERCLA §121 requires on-site remedial actions to attain promulgated State ARARs that are more stringent than Federal ARARS
[9] 40 CFR 300.400(g)(2)
[10] Defined in 40 CFR 300.5, and listed by chemical name in 40 CFR 302.4
[11] Defined in 40 CFR 300.5. and indicated as substances that "may be present and an imminent and substantial danger to public health or welfare of the United States."

Other sources used to develop numerical cleanup standards for groundwater may include reference or "background" concentrations measured in nearby media that are assumed to be unaffected by the Site**.**

There are no numerical, chemical-specific ARARs for sediment under Federal or State law. The basis for risk cleanup goals are discussed below in Table 3.1-1 (human health) and text (ecological risk). Compounds and risk-based sediment "maximum sediment concentrations" were selected for Old Mormon Slough (Table 3.1-2).

Table 3.1-1. Range of Lifetime Carcinogenic Risks for Human Health from Ingesting Fish Tissue Contaminated with 2,3,7,8-TCDD from Old Mormon Slough

Lifetime Consumption Rate *		**30 Years Consumption Rate ****	
0.41 g/day	150 g/day	0.41 g/day	150 g/day
2×10^{-7} - 8×10^{-6}	7×10^{-5} - 3×10^{-3}	1×10^{-7} - 6×10^{-6}	5×10^{-5} - 2×10^{-3}

* Based 70-year exposure duration
** Based on age-weighted exposure duration, 6 years as a child, 24 years as an adult

PAHs posed a risk to all ecological assessment endpoints, most notably for fish and benthic fauna. Dioxin had little effect on the assessment endpoints, but was estimated to be a potential low risk to bird and fish reproduction and health. Pentachlorophenol (PCP) was estimated to have a potential impact on both fish and benthic animals. However, as PCP was present but not widely distributed in sediment, no cleanup goal was established for it in the ROD. Site-related metals were not found to be a risk factor to any of the ecological risk assessment endpoints.

Table 3.1-2. Sediment Contaminants of Concern and ROD-selected Cleanup Goals

Contaminant of Concern	**Sediment Cleanup Goals (Maximum Sediment Concentrations)**
Dioxins/Furans as 2,3,7,8-TCDD TEQ	21 ng/kg
Total PAHs	333.3 mg/kg (Organic Carbon Normalized)

In the foregoing table, the sum of PAHs is organic carbon normalized in the ROD to represent the equilibrium partitioning prediction that lower organic carbon would be associated with higher bioavailability to fish and benthic fauna. Dioxin was estimated to be a potential low risk to bird and fish reproduction and health, and it is the human health risk that drives the number selected. (The ROD did not select an organic-carbon normalization procedure for dioxins.)

2.2 Location-Specific ARARs

The Archeological and Historic Preservation Act (16 USC §469a-1).

Pursuant to §§106 and 110(f) of the NHPA, CERCLA remedial actions are required to take into

account the effects of remedial activities on any historic properties included on or eligible for inclusion on the National Register of Historic Places. The Act provides for the preservation of historical and archeological data that might otherwise be lost as a result of alterations of buildings or terrain. Should a Federal project might cause loss to significant scientific, prehistorical or archeological data, the act requires the lead agency to preserve the data or request the U.S. Department of Interior to do so. The Act is administrative in nature because it is not an environmental standard, and is not an ARAR.

However, Old Mormon Slough and the Stockton Deepwater Channel are man-made channels constructed by prior dredging. No prehistoric or archeological artifacts are expected in any of these deposits and none were noted in any of the sampling that was conducted for the Remedial Investigation.

Regarding moving the former onion barge, EPA conducted an historical evaluation [12] of *The Merit*, and found that it was not eligible for the National Register of Historic Places because it had been significantly altered from its original condition. These findings were provided to the California State Historical Preservation Officer.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA), 42 U.S.C.§4601 et seq.

This act is administrative in nature, and hence not an ARAR. The ESD stated "EPA has determined that the URA is not an ARAR for this ESD because it is not an environmental standard. However, EPA has followed the requirements of the URA for the relocation conducted under this ESD." The relocation refers to the Merit Barge which was required to complete the cap construction.

The Federal Endangered Species Act (ESA) (16 USC, §1531 et seq) and the Magnuson-Stevens Fishery Conservation and Management Act, Section 305(b)

ESA and the Magnuson-Stevens Conservation and Management Acts are administrative in nature and do not establish environmental protection standards; hence, they are not ARARs.

For substantive compliance with the Endangered Species Act lead agency would identify whether a threatened or endangered species, or its critical habitat, will be affected by a proposed remedial action. If it does identify these, the lead agency would avoid the action or take appropriate mitigation measures so that the action does not affect the species or its critical habitat. Consultation with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service (as appropriate by listed or candidate species) is necessary to avoid, minimize or compensate for any adverse impact for any activity that may affect the continued existence of an endangered species or its critical habitat. Should the lead agency determine that endangered species are not present or will not be affected, no further action is required.

[12] US EPA. 2004. National Register of Historic Places Eligibility Evaluation of a Former 1928 Oil Screw River Scow. Prepared by Macfarlane Archaeological Consultants.

Several Evolutionarily Significant Units (ESUs) of threatened and endangered fish species potentially inhabit Mormon Slough. Coordination occurred with U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Game regarding critical habitat (CH) or Essential Fish Habitat (EFH) designation. The aquatic species of concern[13] follow:

Delta smelt	*Hypomesus transpacificus*
Sacramento splittail	*Pogonichthys macrolepidotu)*
Sacramento River winter-run Chinook salmon	*(Oncorhynchus tshawytscha --CH*
Pacific salmon	*Oncorhynchus spp. --EFH*

EPA prepared a Biological Assessment that stated a "not likely to adversely affect" for these ESUs. An ESA Section 7 Consultation Letter of October 1, 2002, from Rodney R. McInnis, National Marine Fisheries Service, to Marie Lacey, EPA, concurred with the determination, and stated that conservation measures in the design would mitigate effects to EFH.

> ***The Porter-Cologne Water Quality Control Act, Cal. Water Code 13000, 13140, 13240, and State Water Resources Control Board (SWRCB) Resolution 88-63, Sources of Drinking Water, Water Quality Control Plan for the Central Valley Regional Water Quality Control Board, the Joaquin Delta Basin (Basin 5-b) ("Basin Plan"), Chapter 2 (Beneficial Uses).***

The 1998 FS states that these laws or rules are applicable as both location and action-specific requirements for discharges to groundwater and surface water. A potential beneficial use of Old Mormon Slough is as municipal and domestic water supply. Substantive NPDES requirements for discharges to surface water were included in the remedial actions for both the Sediment and Surface Water and Soil and Groundwater OUs at the time of the ROD.

2.3 Action Specific ARARs for the sediment and surface water ou

Since construction is completed on the bank protection and capping, there are no remaining action-specific ARARs or TBCs.

3. Considerations of New Sediment and Surface Water OU Regulations Since the ROD

No new information has come to light in this review to suggest ARARs nor TBCs for sediment or surface waters.

Since related cleanup standards for dioxins are set by risk, it should be noted that the EPA dioxin reassessment [14] has tentatively proposed a different carcinogenic slope factor for dioxins. This

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[13] The Ecological Risk Assessment inaccurately portrayed the American shad and the smallmouth bass as species of special concern. Also, the Central Valley spring-run Chinook salmon Sacramento River winter-run Chinook salmon listing has been vacated.

[14] US EPA. 2003 . Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodbenzo-*p*-Dioxin (TCDD) and Related Compounds, NAS Review Draft. EPA/600/P-00/001Cb .

has not been finalized in the EPA Integrated Risk Assessment Information System (IRIS), as it is still being considered in light of the National Research Council review [15]. Accordingly, the toxicity basis for chemical-specific action levels has not changed at this time of writing. However, the World Health Organization has made minor changes to the methods by which toxicity equivalents are calculated. [16] These changes are minor, and would not affect the efficacy of the clean up, but may slightly affect how summary toxicity is calculated during monitoring. Accordingly, the legal analysis performed at the time of the ROD and ESD remains valid.

[15] NRC. 2006. Health Risks from Dioxin and Related Compounds. Evaluation of the EPA Reassessment. National Academies Press. http://www.epa.gov/ncea/pdfs/dioxin/nas-review

[16] World Health Organization (WHO) 2005. *Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds*. ToxSci Advance Access published online July 7, 2006. http://www.who.int/ipcs/assessment/tef_update/en/

Attachment 4

Institutional Controls Summary

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Institutional Controls Summary for the McCormick and Baxter Superfund Site
First Five-Year Review

Introduction and Purpose

Seattle District, U.S. Army Corps of Engineers is assisting the U.S. Environmental Protection Agency, Region 9, with the completion of statutorily required Five-Year Reviews. One of the steps in evaluating the protectiveness of an implemented remedy for the period of interest is a review of a site's institutional controls. Institutional controls (ICs) in their strictest sense are non-engineered instruments that minimize potential for human exposure to contaminants, limit land use, and/or protect the integrity of the remedy. Sometimes engineered access restrictions such as fencing, however, are considered ICs and will be included for discussion in this memorandum. The goal of this technical memorandum is to document which ICs are in place and to evaluate their effectiveness.

Background

The MBSS Record of Decision (ROD), published in 1995, presented the selected final remedial actions for vadose zone soils and sediments. The selected remedy for vadose zone soil was excavation of the eastern portion of the Site (Subarea X) and consolidation and capping within the western portion of the Site (Subarea Y). The sediment remedy was in-place capping within Old Mormon Slough. Both these remedies were designed to chemically isolate contaminants, to render the exposure pathways incomplete, and to reduce the contaminant load to groundwater.

The ROD presented the interim groundwater remedy of extraction and treatment with dedicated non-aqueous phase liquids (NAPL) recovery where appropriate. The ROD stated that a final groundwater remedy will be selected in the future to address threats remaining after implementation of interim measures. The interim groundwater remedy has not been implemented to date due in part to recent findings that the contaminant plumes appear to have stabilized and appear to be naturally attenuating. Groundwater monitoring for contaminants of concern as well as natural attenuation parameters is ongoing.

There exist at the Site two operable units (OUs), that of 1) uplands soils and groundwater,and 3) surface water and sediment. Likewise for the purpose of this discussion, institutional controls are separated according to which OU (or OUs) they pertain to. The ROD authorized access rights to the Site that permit the USEPA and the State to monitor and maintain the selected remedies and land use restrictions that prohibit interference with the selected remedies which run with the land, to the extent available.

The following list is a compilation of all project-related documents reviewed in support of the ICs assessment. Note thus far no real estate documents have been obtained for review.

- Record of Decision (USEPA Mar 1999),
- Soils and Groundwater Feasibility Study Report (ICF Kaiser Apr 1999),
- Final Design Analysis Report, Surface Water Operable Unit Sediment Cap (USACE Dec 2001)
- Explanation of Significant Differences (USEPA Sep 2005),

- Operation and Maintenance Plan for Surface Water-Sediment OU (USEPA Jan 2006), and
- Draft Management Plan for the Final Groundwater Remedy Focused Feasibility Study (USACE Apr 2007).

ICs Required by the Record of Decision

Current USEPA guidance requires ICs be specified if the remedy does not allow for unlimited use and unrestricted exposure, as is the case with the selected MBSS soil and sediment remedies. The need for ICs was stated in the ROD, however, details regarding the ICs appear to be incomplete. Additionally, while ICs were mentioned in the Soils and Groundwater Feasibility Study Report (ICF Kaiser 1999), details regarding ICs were not found in any other site documents since the ROD.

Surface Water and Sediment Operable Unit

Thus far, the only OU remedy to be fully field-implemented has been the surface water and sediment remedy, completed in 2006. The ROD stated that ICs are required within the capped portion of the slough, along with long term monitoring and maintenance, to ensure the integrity of the cap is maintained. According to the ROD, ICs were to include navigational access restrictions to the slough (log boom, as described below), a prohibition against consumption of fish caught from the slough (through warning signage), and prevention from exposure to slough sediments (through construction and maintenance of sediment cap, and warning signage). Additionally, security fencing is installed around the perimeter of the slough (fencing associated with the industrial properties surrounding the slough) which may be considered an additional access control.

The USEPA and California EPA/Department of Toxic Substances Control (DTSC) signed a State Superfund Contract (SSC, dated Sep 8, 1999, as amended Nov 7, 2000) to document the responsibilities of EPA, as the lead agency, and DTSC, as the support agency during the remedial action and subsequent operation and maintenance (O&M) for the Surface Water-Sediment OU. An O&M Plan for the Surface Water-Sediment Operable Unit was developed in 2006 which provides the framework for developing a more detailed O&M Manual, to include the specifics of the ICs for this OU. The O&M Manual is yet to be written, however, this manual is to document the specifics regarding the ICs the USEPA and State determine are necessary to protect the sediment cap. Components of the remedy for ICs consideration are the southern bank stabilization project, sediment cap including armoring, vessel removal and bathymetry surveys, shore line vegetation, and access restrictions repair/replacement. Initial cap O&M monitoring is planned for later this year.

The ROD denoted two “hot spots” where contaminant concentrations exceeded sediment cleanup numbers within the uncapped portion of the Old Mormon Slough at its mouth. The ROD stated that ICs would be used to limit navigational access to the slough and prevent disturbance of the hot spots. Access restrictions have been implemented by the installation of a fixed log boom extending across the entire slough channel. Additionally, warning signs aimed at preventing disturbance of the cap by boat traffic are in place, as are signs warning against consumption of fish from the slough. The slough is located behind several industrial facilities which have

fencing along the shore line restricting access to the slough, although breaches in the fence have been observed.

Soils (A Component of the Soils-Groundwater Operable Unit)

Because some soil contamination remains on Site and some residual risk remains under the selected remedy, the soils remedy includes long-term implementation of ICs as stated in the ROD. The selected remedy does, however, eliminate the need for soil institutional controls in Subarea X because contaminated soils are to be removed from that area and consolidated below a cap over Subarea Y.

Detailed ICs regarding the soils remedy were not included in the 1999 ROD. The following paragraph concerning soil cap ICs was taken in its entirety from Section 8.3.1 of the ROD.

> *The cap remedy would be maintained regularly to minimize cracks and degradation. This remedy would include all or some of the following institutional controls: Site access controls (fencing and controlled gates); land use restrictions such as restricting the end use of the Site to appropriate industrial uses (and prohibiting other uses); and proprietary and/or governmental land use restrictions such as prohibiting, limiting or controlling conditions of excavation of any impacted soil during future construction, providing appropriate notice (in land records and otherwise) that hazardous wastes remain at the Site, and prohibiting other activities that could cause a potential threat to human health and the environment. Institutional controls for Subarea X [eastern portion of the Site] would need to be less stringent than for Subarea Y [western portion of the Site]. Fencing, controlled entry gates and restrictions on excavating to certain depths would not be needed for this portion of the Site because no contaminated soil would remain in Subarea X.*

The soils Remedial Design (RD) documentation is not available at this time; therefore an in-depth evaluation of planned ICs can not be made. ICs for the MBSS should include access and use restrictions of the capped portion of the uplands, and monitoring. Access restrictions for the upland soils OU include fencing around the Site, a manned 24-hour security station, and warning signs. Engineering controls should be utilized to control migration of contaminated soils from the Site via surface runoff.

Groundwater (A Component of the Soils-Groundwater Operable Unit)

The only groundwater-related OU IC in place is prohibition against installation of groundwater extraction wells for consumptive or industrial uses at the Site or immediately downgradient of the Site. The California Department of Public Health is responsible for conducting reviews of water supply well permits with regard to the location of a well with respect to potential contamination hazards. No water supply wells are allowed at the MBSS or immediately downgradient of the site in any aquifer zones because groundwater beneath the MBSS is of insufficient quality (i.e., high salinity and total dissolved solids) to allow unlimited use and unrestricted exposure scenarios.

Additionally, the EPA's recent focus on reevaluation of Sites for vapor intrusion (VI) concerns has led to a planned VI investigation for the MBSS. If conditions warrant, ICs regarding vapor intrusion may be implemented in the future.

Once a final groundwater remedy is selected and documented, additional groundwater ICs will likely be established.

Site Visit

On Apr 7-8 2008, a site visit and inspection was conducted by USACE representative Joe Marsh. The portion of the slough in which the sediment remedy applies was observed for current conditions of controls restricting or prohibiting access. The log boom was observed to be in place and in good condition. The fencing along the perimeter of the slough was observed to be fairly new and in relatively good condition, although the older fencing along the upland portion of the site is old, in disrepair along several stretched, and is easily circumvented. Holes large enough for human entry/egress were observed in the fencing.

Regarding the upland soils and groundwater OUs, the site visit revealed that a 24-hour security service continues to be in place and, along with the perimeter fence around the upland portion of the site, these access controls somewhat restrict access to authorized personnel only. Hazard/warning signs are posted along the fence line, although some of the signs have been faded by the sun and are not legible. Additionally, adjacent industrial properties along the western portion of the Site have their own security, including guards and cameras, which help to prevent unauthorized entry to the MBSS. Groundwater monitoring well surface completions generally were in good condition and locked, restricting access to impacted Site groundwater.

Conclusions and Recommendations

The following conclusions and recommendations are made based on this review of Institutional Controls:

- The Surface Water-Sediment OU institutional controls in place are general in nature and are not of sufficient detail to ensure their effectiveness and protectiveness,
- Real property title information should be analyzed prior to submission of the Five-Year Review Report to ensure that any proprietary controls in place are properly implemented.
- The forthcoming Surface Water-Sediment OU O&M Manual should document detailed and enforceable ICs for this OU, and should also document periodic review of ICs and enforcement tools,
- Neither the soils nor groundwater OU remedies have been implemented; therefore, final remedial ICs have not been established. Soil OU ICs should be included in the remedial design, and
- Once detailed ICs have been established for sediment and soils, the decision documents should be amended to include such detailed information. Accordingly, detailed ICs should be developed and included in the future groundwater ROD.

Attachment 5

Groundwater Data Summary

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Groundwater Data Summary for the McCormick and Baxter Superfund Site First Five-Year Review

Introduction and Purpose

Seattle District, U.S. Army Corps of Engineers is assisting the U.S. Environmental Protection Agency, Region 9, with the completion of statutorily required Five-Year Reviews. A Five-Year Review is required at the MBSS in Stockton, California because the bank stabilization component of the Surface Water and Sediment Operable Unit (OU) remedial action was implemented in December 2002. Prescribed remedial action implementation triggers the start of the five-year review process. Despite the absence of an active interim or permanent groundwater remedy at the MBSS, the purpose of this memorandum is to summarize recent Site groundwater data for inclusion into the Five-Year Review report. It is important to reiterate, however, the principal purpose of the MBSS First Five-Year Review is to evaluate the sediment remedy, not the groundwater conditions.

Background

Groundwater monitoring has occurred at the MBSS since at least 1984, when a Preliminary Assessment of the Site was conducted. In 1999, the Record of Decision (ROD) called for an interim groundwater remedy of extraction and treatment including dedicated non-aqueous phase liquids recovery wells, where appropriate. The assumption at the time of the ROD was that as emerging remedial technologies advanced, the likelihood increased for a treatment method more effective than pump and treat to be utilized. Since 2003 semi-annual to annual groundwater monitoring has been conducted. Evaluation of the data has indicated the contaminant plumes appear to be stable and natural attenuation may be occurring. This evidence has led to the delay of the start of the interim groundwater remedy and instead has focused groundwater efforts on continued monitoring and a groundwater remedy focused feasibility study.

Groundwater Data Evaluation

A comprehensive evaluation of groundwater chemical and hydraulic data, in context with pertinent geologic information, was presented in the *Draft Management Plan for the Final Groundwater Remedy Focused Feasibility Study* (USACE 2007). Groundwater data up to April 2006 were included in the report. Due to the completeness of the data evaluation presented in that plan, it is not necessary to reinterpret groundwater data for the Site. The two rounds of groundwater monitoring data not included in the plan (Rounds 13 and 14, from April and October 2007 respectively), along with data dating back to April 2003, are shown in Enclosure 2 for six Site monitoring wells. Well locations are depicted in Enclosure 1. One well from each of the five aquifer zones, A through E (A being shallowest and E being deepest), were chosen as examples. These include SW-187A (A zone), DSW-5B (B zone), ONS-1C (C zone), ONS-1D (D zone), and MW-4E (E zone). These wells were selected generally because they reflect some of the highest contaminant concentrations within their respective aquifer zones. Note that although MW-1A was not depicted in Enclosure 1 for the A zone because it has not been consistently sampled, this well contains some of the highest contaminant concentrations of the

Site (eg., 21,000 ug/l naphthalene, 270 ug/l acenaphthene, and 11,000 ug/l PCP in 2007. MW-1A is locate approximately midway between wells SW-187A and ONS-1C.

Groundwater Findings Based on Data Collected to Date

Based on information contained in the *Draft Management Plan (USACE 2007)* and the latest two rounds of groundwater chemical and hydraulic data, the following statements adequately summarize current Site groundwater conditions.

Hydrostratigraphy and Hydrogeology:

- Site hydrostratigraphy is complex. The shallow aquifer and the uppermost portion of the deep aquifer beneath the MBSS have been subdivided into zones A through E by past investigators at the Site. These five zones should not be considered hydraulically isolated from one another, instead they should be considered separated by silt-sand mixtures which impede but do not prevent groundwater and chemical constituent movement between zones.
- Currently there are more than 100 groundwater monitoring wells, 60 of which have been sampled during Rounds 13 and 14. Of the 100-plus total wells, at least 35 are screened within the A-zone, 19 within the B-zone, 20 within the C-zone, 15 within the D-zone, and 18 within the E-zone.
- Typical horizontal groundwater velocities in the A-, B-, C-, D- and E-zone units are 0.14, 0.05, 0.05, 0.03, and 0.18 ft/day, respectively. These estimates are quite low, and equate to just 11 to 65 ft/year.
- In areas of the Site where interzone semi-confining units are of substantial thickness, vertical groundwater velocities are approximately two orders of magnitude lower than horizontal velocities. Therefore groundwater flow beneath the Site is predominantly horizontal within sand zones.
- The observed vertical gradient of flow has been downward between all aquifer zones, with few exceptions.
- Horizontal hydraulic gradient directions have ranged historically from east to south, and have varied due to seasonal, nearby historical water extraction, and aquifer zone differences.
- Recent horizontal hydraulic gradient magnitudes are relatively small, and for the A-, B-, C-, D- and E-zones have averaged 0.0023, 0.0010, 0.0004, 0.0008, and 0.0005 ft/ft between April 2005-March 2006.
- Hydraulic gradient magnitudes and groundwater depths within the E-zone have decreased significantly since 1993, likely reflecting termination of pumping from City of Stockton production wells.

Climatological Influence:

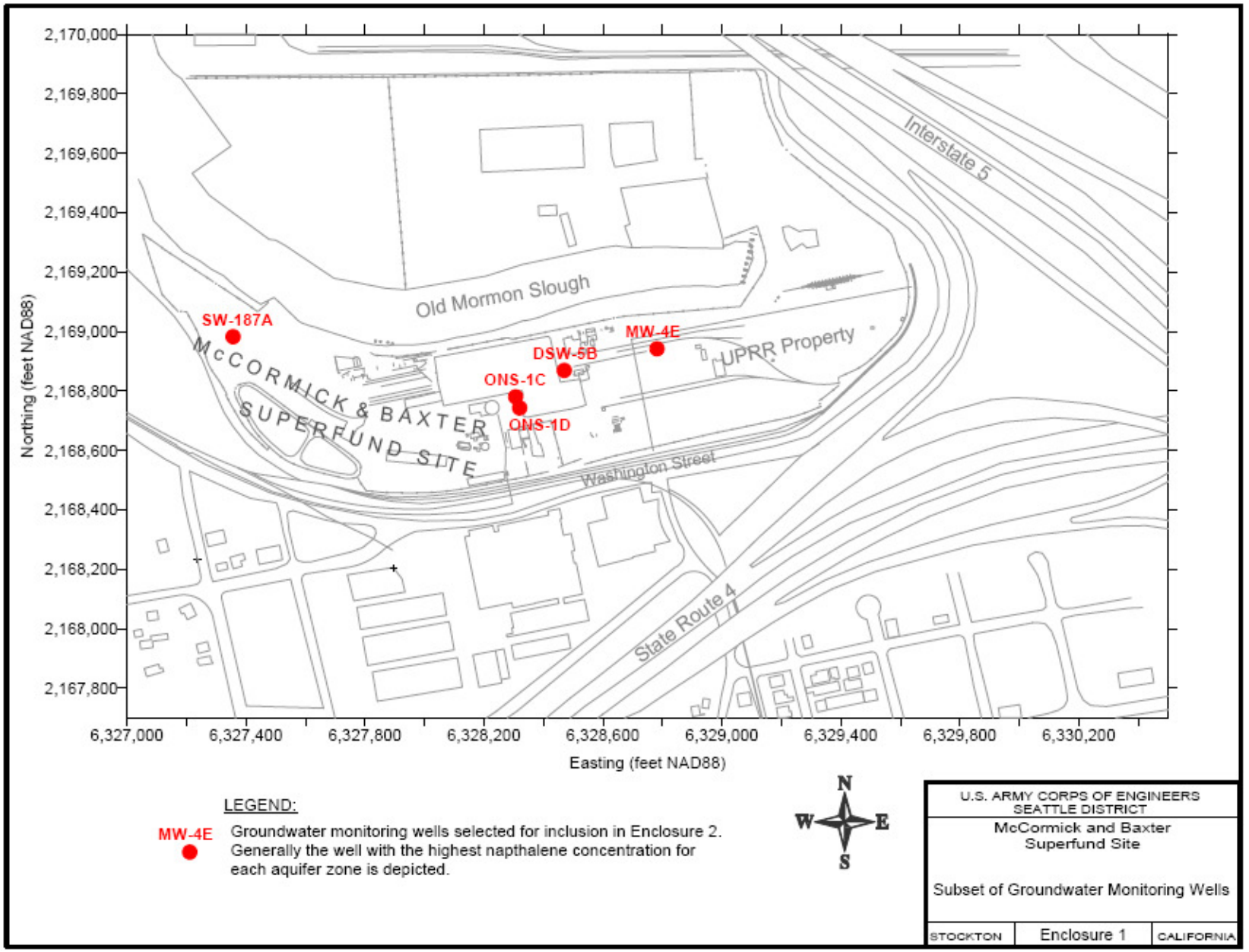
- Between January 2002 (start of review period) and September 2007, Stockton, California precipitation was six percent less than the average of 13.84 inches per year. Three years received precipitation slightly above average (2004, 2005, and 2006) and two years received

precipitation slightly below average (2002 and 2003). Between January and September 2007, Stockton received only 57 percent of normal precipitation.

- The majority of the site is unpaved and relatively flat; therefore some recharge of A-zone groundwater is expected to occur on site. However, the majority of groundwater is believed to be derived from upgradient sources, including Old Mormon Slough and upgradient groundwater.

Groundwater Chemistry:

- Contaminants of concern (COC) for groundwater, based on either MCL exceedances or Region 9 PRGs based on residential exposure, are: antimony, arsenic, benzo(a)anthracene, benzene, chrysene, pentachlorophenol, 2,3,78-TCDD/TEQ, acenaphthene, carbazole, dibenzofuran, 2,4-dichlorophenol, fluorene, manganese, 4-methylphenol, and naphthalene.
- Risk driver COCs appear to be naphthalene, acenaphthene (both due to vertical and lateral extent and toxicity), pentachlorophenol (primarily limited to A-zone), and benzene (limited to near-source area and for vapor intrusion concerns).
- Acenaphthene has been transported farther off-property in the downgradient direction than any other COC, although its Region 9 PRG is relatively high (370 ug/l versus 6.2 ug/l for naphthalene, for example).
- A significant quantity of non-aqueous phase liquids (NAPLs) is estimated to exist beneath the Site, primarily within the A- and B-zones to a depth of about 80 feet but believed to be present to depths approaching 200 feet (and corresponding to the D-E aquitard).
- Nitrate-, iron-, and sulfate-reducing conditions appear to occur side-gradient to the source in the A-zone, with methanogenic conditions in the source area and downgradient of the source area. The geochemical conditions become increasingly reducing with depth, with some iron-reducing conditions along with sulfate-reducing and methanogenic conditions, in the B-zone but generally sulfate-reducing to methanogenic conditions in the C, D, and E zones. The conditions in the E zone are generally methanogenic.
- The contaminant plumes appear stable based on several years' worth of chemical data.
- There is no current exposure to impacted groundwater via the ingestion pathway because no municipal or private drinking water wells are located within or proximal to contaminated groundwater.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6,329,000
6,329,400
6,329,800
6,330,200
Easting (feet NAD88)
Interstate 5
Old Mormon Slough
SW-187A
MW-4E
DSW-5B
UPRR Property
ONS-1C
ONS-1D
McCORMICK & BAXTER
SUPERFUND SITE
Washington Street
State Route 4
LEGEND:
MW-4E
Groundwater monitoring wells selected for inclusion in Enclosure 2. Generally the well with the highest napthalene concentration for each aquifer zone is depicted.
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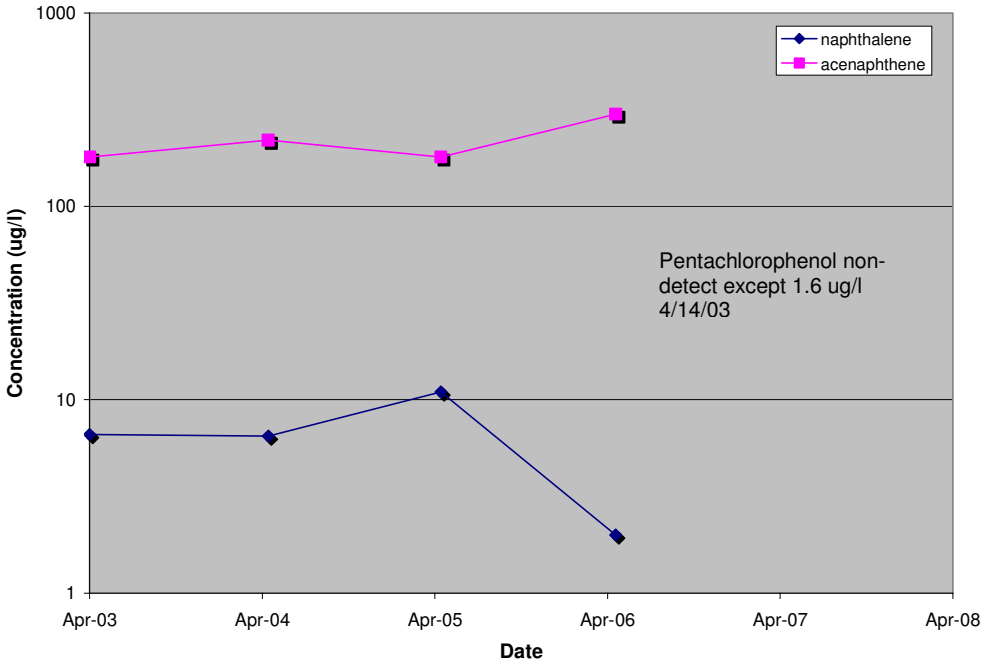
W
E
S
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
McCormick and Baxter
Superfund Site
Subset of Groundwater Monitoring Wells
STOCKTON
Enclosure 1
CALIFORNIA

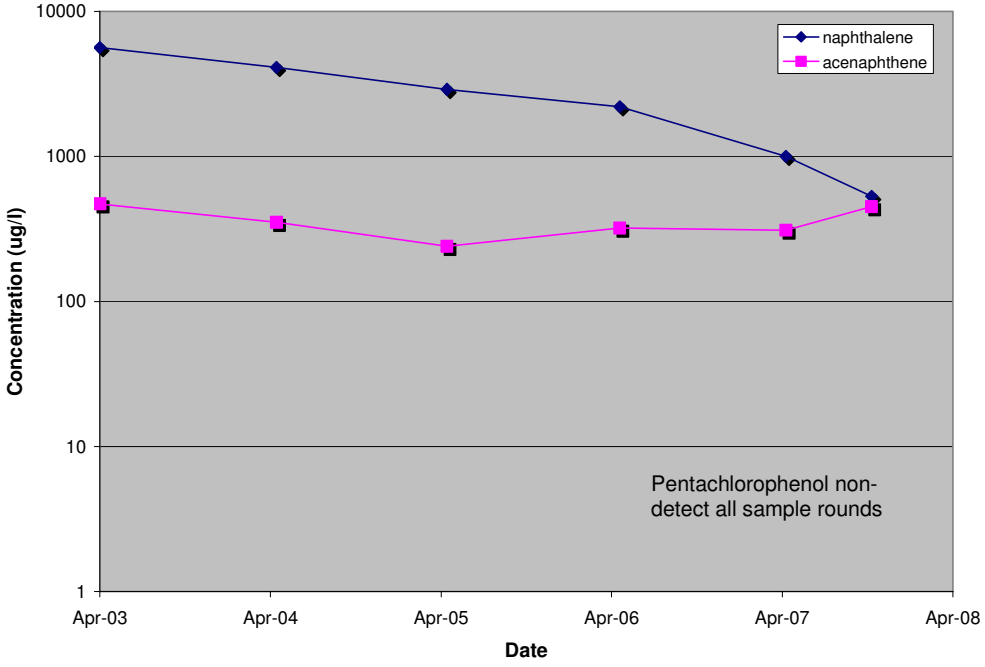
Enclosure 2

2003-2007 Naphthalene, Acenaphthene, and Pentachlorophenol Concentrations at Select Monitoring Wells from Each Aquifer Zone (A through E).

Well SW-187A (A Zone)



Well DSW-5B (B Zone)



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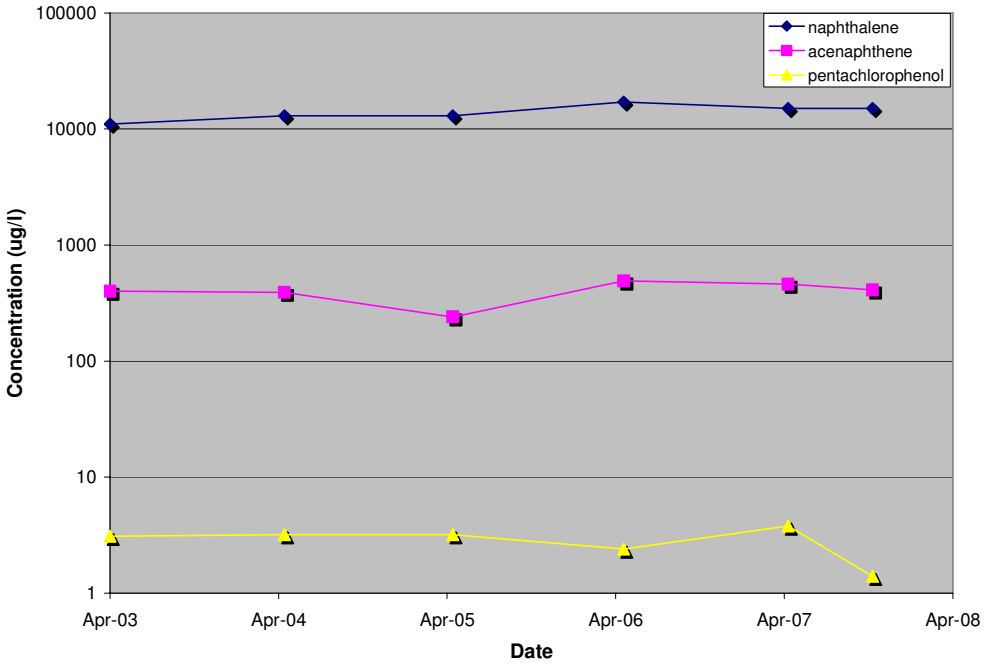
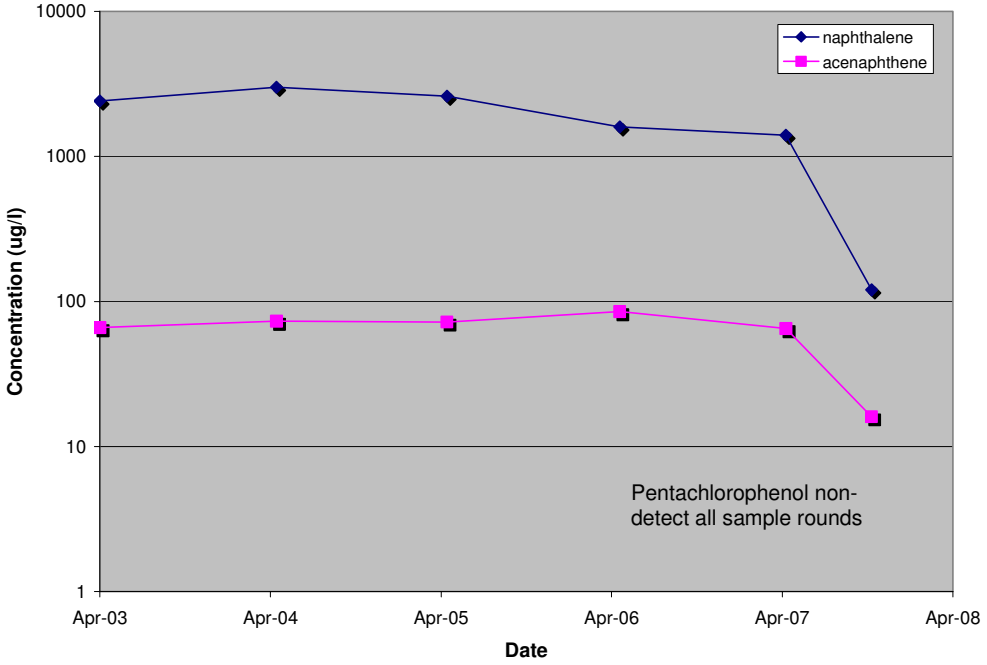
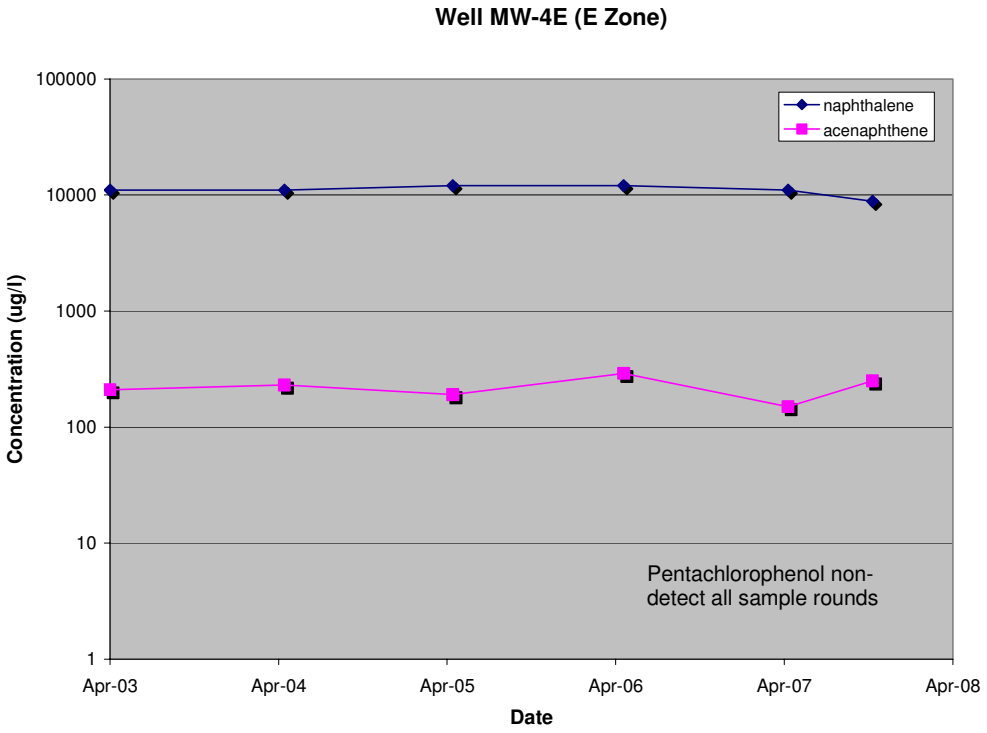


Well ONS-1D (D Zone)




Well MW-4E (E Zone)
100000
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1000
100
10
1
Concentration (ug/l)
naphthalene
acenaphthene
Pentachlorophenol non-detect all sample rounds
Apr-03
Apr-04
Apr-05
Apr-06
Apr-07
Apr-08
Date

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Attachment 6

Advertisement for Notice of FYR, McCormick and Baxter Superfund Site
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